The Builder.

VOL. LX. No. 2521. SATURDAY, MAY 30, 1891.

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The Management of Roads by County Councils.

TWO years have now passed out of the three which have been decreed as the life of the first County Councils, and it will be interesting to note what effect their creation has had on the management of highways throughout the country. The Councils were charged by the Local Government Act of 1888 to take over the maintenance of the main roads, and we have recently been placed in possession of a good deal of information relating to the way in which that part of the Act is being worked, partly from a discussion which occurred at the first annual general meeting of the County Councils' Association, and, secondly, from a report which has been compiled for the County Surveyors' Society by Mr. T. H. B. Heslop, the County Surveyor of Norfolk. We will deal first with this gentleman's valuable compilation. To the surveyor of each of the sixty-three counties into which England and Wales have been divided by the Act, he forwarded a string of questions, the most important of which were as follows:—

1. What system has been adopted for the management of your main roads?

2. Upon what principle has your Council settled with urban authorities which claim to retain the management of the main roads in their districts? How do you act with reference to (*a*) "Reasonable improvements;" (*b*) "Supervision" and "establishment charges?" (*c*) Has any difficulty or dispute arisen on this point?

3. Do you water the roads or contribute in any way to this? and if so, upon what basis?

4. Do you roll your roads by steam power or other means? Can you give average cost per yard super. for rolling?

5. Footpaths. The liability to maintain these being now thrown upon County Councils, does your Council contemplate making any stipulations with regard to paved footways in urban districts?

6. Have you had any case of "extraordinary traffic" under the section of the Highways Act of 1878? If so, state method of dealing with it.

7. Is your salary paid by commission? If so, have you received any such payment from your County Council?

From forty-eight of these counties he received replies, so that although the report is not complete, it is sufficiently so to enable a very good idea to be obtained of how the above-named matters are being attended to. There is, of course, a great diversity in the manner and in the matter of the replies which have been given to these questions by the county surveyors. It will be recognised that the questions afforded considerable scope for dilating on the various topics introduced to the notice of these gentlemen, but in some cases, unfortunately, the supply of the necessary information is remarkably scant and the answers most laconic,—errors which will probably be rectified if the report becomes an annual publication.

The perusal of this document has a natural tendency to bring under review those who are the subscribers to the answers,—persons who occupy most important professional positions in each county, and who are the witnesses (so to say) to the evidence in this case. It is not unusual to attach weight according to the eminence of the individuals who give opinions and announce facts; and when a report is issued by a Parliamentary or a Royal Commission, our confidence in it is greater if we are satisfied with the composition of that Committee. It may be interesting, therefore, to analyse the *status* of the gentlemen who furnish the details from which this report has been compiled. There are three professional institutions which may well be styled national, and to which most English architects, engineers, and surveyors of any eminence belong—viz., the Royal Institute of British Architects, the Institution of Civil Engineers, and the Surveyors' Institution: of these three, the Institution which might more pre-eminently be expected to supply county surveyors of roads is that of the Civil Engineers, but of the forty-eight county surveyors now under review, only thirteen belong to that Institution, six to the Surveyors' Institution, and six to the Royal Institute of British Architects. Three of these gentlemen belong to two of those Institutions, but more than half do not belong to either of the three. Is it too much to expect that, when vacancies occur in such county appointments, the County Councils will make it a condition that the vacancy shall be filled by a gentleman belonging to at least one of those professional Institutions?

Five counties,—viz., Bedford, Cambridge (Isle of Ely Division), Essex, Stafford, and Worcester,—have appointed special county surveyors of main roads, independent of the county surveyors, and we are, therefore, brought into contact with a question of remarkable importance, having regard to the large expenditure involved by the maintenance of main roads. What are the qualifications most desirable for a county surveyor of roads, and should his duties be merged in those of the ordinary county surveyor or should they not?

On this point we are very much inclined to endorse the wisdom of the step taken by the five counties above-named, for the close supervision, the careful inspection, and the considerable amount of travelling which is necessarily attached to such an office as that of a county surveyor of roads, can scarcely be performed in a county of any size with the efficiency which is the soul of economy, if it be combined with the ordinary duties of a county surveyor. The fact is that one is work for an engineer and the other for an architect, and when in combination, one or other is liable to the neglect which from physical causes is unavoidable. There would be ample occupation in most counties for the whole time of a good engineer on work about which it is very rare to note much scientific treatment, the contrast between the skill displayed in town work and country work being remarkable. It is precisely the class of work which requires sound judgment and a master's eye, and we can scarcely imagine a measure of greater and more real economy for counties of any magnitude than the creation of such an office. The holder should be an engineer, and he should be a man whose integrity is beyond suspicion, for, as is well-known, a road surveyor can, with but little fear of detection, acquire round the corner enough to make a very comfortable addition to his salary, every penny of which comes out of the ratepayers' or the taxpayers' pockets.

The result of the appointment of the late Sir Henry Harness, then Captain Harness, of the Royal Engineers, as supervisor of the roads of South Wales, on account of which a Government loan had been granted, is in itself sufficient to inspire confidence in the success of such a creation. He was succeeded Mr. Codrington, M.I.C.E., now of the Local

Government Board, admittedly one of our greatest, if not the greatest authority on road affairs in the kingdom. Under these gentlemen the roads of South Wales were converted from quagmires into the best and most economically-managed roads in the kingdom, and it should be generally known that these gentlemen had not merely authority over main roads, but over *all* the roads in South Wales. This was an intelligible system; but as the case stands at present, not merely under the Local Government Act of 1888, but under previous Highway Acts, large grants have been annually made from the Imperial treasury in aid of road maintenance in England without any sort of guarantee (which would be of any real value) that those grants are being expended in the most profitable manner. One county may adopt one system of management, and another county another system, one being excellent and the other execrable; but in the latter case the Government grant cannot now be withheld, and the country consequently recompenses the evil with the good. It may be urged that the result of the adoption of a bad system falls with greater force locally, and that it will rectify itself, and also that there is an aversion to grandmotherly government, and that Government inspection is an extra expense, and so on; but those who so argue perhaps omit to note that the Government does retain a hold over the proper utilisation of grants for many purposes,—such as the administration of the poor law, the care of lunatics, registration of births and deaths, vaccination, education, &c., so that uniform systems of management are established throughout the land for these important public matters.

But roads are still in the chaotic state which will be immediately recognised by any one who may have the opportunity of perusing Mr. Heslop's report or the proceedings of the last meeting of the County Council Association. So large a proportion of the cost of maintaining main roads is now derived from sources other than the rural ratepayer, that it would seem fairer if the interests of those who find those funds were protected by some form of Government inspection similar to that which exists for the other purposes above-mentioned, so as to obtain a guarantee that these large grants were being put to the best use or otherwise withheld. It might be thought that the presence of a leavening of borough councillors in the council of each county would have ensured this object, this careful guard over funds derived in great measure from urban inhabitants, but the effect is not so—they have many other things to attend to, and if not they would generally be outvoted by the rural councillors. On the whole we are constrained to admit that the only form of control which can be relied on as effective is that of Government inspectors.

It is well known to every one who has devoted sufficient attention to the matter, from the Chancellor of the Exchequer downwards, that absolute equitability of rating is not attainable, and can only be approximated, but there is one point in connexion with road management which has seemed to us never to have received the attention which it deserves, and that is, what is the right or the most appropriate proportion for the main roads in a county to bear to the ordinary highways, mile for mile, and what are the influences or circumstances of counties which would conduce to such proportion, great or small, as the case may be?

It was, and is, manifest that it is unfair for a parish through which no main road runs to be charged as high a county rate as that paid by a parish which, owing to accidental circumstances, is traversed, possibly from end to end, by a main road. In this respect the establishment of highway districts embracing several parishes produced no real relief of local taxation to the individual parish so circumstanced, for the county rate levied for main road maintenance is simply subdivided by the authorities of highway districts amongst the different parishes, according to their rateable value. Tracing the history of the matter, we see that the position has been entirely reversed: the parochial complaint was, in the first instance, at having to pay all the cost of maintaining a road over which outsiders travelled; then came the turnpikes, which in some measure relieved them; then came the abolition of the turnpikes, and the commencement of Government grants,—first one-half of the cost, then three-quarters, and now something which is not yet accurately known, as it depends on a variety of circumstances, but which ought to be something between-three-quarters and the whole. Consequently, the more main road there is in a parish the better for it.

Comparative Mileage of Main Roads in Counties.

1888.		1890.	
County.	Proportion of mileage of main road to ordinary highways.	County.	Proportion of mileage of main road to ordinary highways.
1 Gloucester ...	1 to 2·7	1 Gloucester ...	1 to 2·0
2 Bedford	,, 2·8	2 Bedford	,, 2·2
3 Huntingdon..	,, 3·2	3 Huntingdon.	,, 2·5
4 Wilts	,, 3·3	4 Oxford	,, 2·6
5 Westmoreland.....	,, 3·4	5 Cambridge ...	,, 2·8
6 Worcester ...	,, 3·7	6 Norfolk	,, 2·9
7 Derby	,, 3·7	7 Westmoreland.....	,, 3·2
8 Dorset.....	,, 3·8	8 Wilts	,, 3·3
9 Stafford	,, 4·0	9 Worcester ...	,, 3·3
10 Oxford	,, 4·0	10 Dorset	,, 3·4
11 Cambridge...	,, 4·2	11 Essex	,, 3·5
12 Monmouth ...	,, 4·2	12 Derby	,, 3·5
13 Chester	,, 4·3	13 Berkshire ...	,, 3·7
14 Warwick.....	,, 4·4	14 Cumberland.	,, 3·7
15 Rutland	,, 4·5	15 Rutland	,, 3·8
16 Durham	,, 4·6	16 Lancashire...	,, 4·0
17 Nottingham.	,, 4·6	17 Stafford	,, 4·0
18 Cumberland.	,, 4·7	18 Leicester ...	,, 4·1
19 Northampton	,, 4·7	19 Chester	,, 4·2
20 Northumberland.....	,, 5·3	20 Warwick ...	,, 4·3
21 Essex	,, 5·3	21 Monmouth ...	,, 4·3
22 Leicester ...	,, 5·4	22 Nottingham.	,, 4·5
23 Norfolk	,, 5·5	23 Durham	,, 4·6
24 Hampshire...	,, 6·2	24 Northampton	,, 4·7
25 Berkshire ...	,, 6·5	25 Northumberland.....	,, 4·8
26 Kent	,, 6·5	26 Hampshire...	,, 6·0
27 Buckingham.	,, 7·3	27 Kent	,, 6·2
28 Hertford.....	,, 7·4	28 Buckingham.	,, 6·8
29 Lincoln	,, 9·0	29 Hertford.....	,, 7·0
30 Lancashire...	,, 9·9	30 Lincoln	,, 8·3
31 Cornwall.....	,, 11·0	31 Cornwall.....	,, 9·0
Average	1 to 5·0	Average	1 to 4·2

The above table has therefore been prepared to illustrate how this matter stands in most of the English counties. Gloucester, which stands at the top, has now exactly one-third of the roads of the county classed as main. The council of this county happens to be under the chairmanship of a gentleman, Sir John Dorrington, who has always understood and taken an enlightened view of economic road management, and was one of the first to follow the example of South Wales (possibly from the proximity of the two districts) in the use of the best material even at a high cost. The two "university" counties have both advanced considerably, and, singularly enough, are next each other in the list both in 1888 and 1890.

Lancashire, Essex, and Norfolk have each made a great increase, the first being under the chairmanship of the President of the County Council's Association, the Right Hon. J. T. Hibbert, the second is one of the few counties in which a special surveyor of roads has been appointed, and the third has for its surveyor the compiler of the above-mentioned report (Mr. Heslop). These three counties account for just one-half of the increase of main-road mileage in the whole list.

The important counties of Hampshire, Kent, and Lincoln stand very low, and Cornwall still closes the list.

Suffolk in 1888 had the remarkable disproportion of 1 in 22·6! and we are not aware of any great change yet in this respect. It appears, then, that the increase in the proportion of main road in a county is not accidental, but has been carried out advisedly by men who recognise that such a policy is advantageous in every respect, and an examination of the order in which the counties stand in this table will reveal no other circumstance which can account for the above-mentioned facts.

Mr. Heslop's report is in itself so instructive, if perused with care, that it seems a pity to confine it to the county surveyors. There are a great many persons both in town and country, and more particularly those who have, or may have, to serve on the Highway Boards or Committees of rural or urban districts, and of their counties, to whom this report should be beneficial, and we throw out the hint to the County Council Association to get leave to reprint and disseminate it. The more these matters are ventilated, and the greater the opportunities for comparison, the greater is the likelihood of improvement in this great public operation. The report shows very clearly that there is a great variety of systems of management, and that in no two counties is precisely the same system followed.

There is, however, no question with which County Councils have at present to deal which bristles with more difficulties than the relations between counties and towns for the contributions which the latter should receive (out of the Government grants) towards the cost of maintaining those portions of the streets which come under the head of main roads. The gentlemen of the long robe are thriving well on this fertile source of litigation, and the question has been still further complicated by the attempt to divorce (in the matter of cost) a roadway or street from the footpaths or pavements which fringe it. The result of litigation between Wiltshire and Warminster on this point, decided by Judges Grantham and Charles in the course of last year, has given rise to much debate. They decided that Warminster was entitled to receive contributions from Wiltshire equivalent to the cost of the maintenance and repair of, and reasonable improvements to, all or any of the footpaths on the sides of the main roads as parts of such main roads, Justice Charles adding, "It is quite clear that the *whole* expenses of the main road, from hedge to hedge, are thrown on the County Council." Unfortunately, it is quite as clear from the wording of the Local Government Act that there is no justification for deciding that the County Councils are liable for the *whole* of such expenses, the wording of Cl. 11 (2) being that the county shall contribute *towards* the cost of maintaining such (urban) main road. However, Wiltshire has not appealed from this decision, but so strongly do most County Councils feel on this point, that passive and active resistance is offered generally. The Act unquestionably requires to be more definitely worded on this point, as much money is going into the lawyers' pockets which would be far more beneficially expended on the roads and streets; there are other points also in this Act which might be amended clearly, so as to remove any excuse for resorting to litigation. We should have supposed that an allotment by the Treasury of a grant to each Local Board or Corporation, based on the rateable value of each town, and proportionate to the total grant to each county, would have been the simplest mode of dealing with such cases, and that such amounts could have been paid direct without passing through the County Treasurers, or cumbering and complicating the County accounts. There would have been no question then about which of the streets, or parts of streets, of a town were "main roads," As a matter of fact, the cost of maintaining, in the one case, streets in towns, and, in the other case, roads in the country, bears as nearly as possible the same ratio towards the rateable values of the areas over which the cost is incurred, so that, though the towns might receive under such an arrangement more than they do at present towards this item of ex-

pense, it would be a fair and equitable arrangement. This would also dispose of the question about contributing to the cost of watering roads, which is never or scarcely ever done outside the limits of an urban authority.

With respect to steam-rolling, as much difference of opinion exists on this as on other points. The North-Western county (Cumberland) calls the steam-roller the "tool of the amateur," and does not use it, whilst the South-Eastern county (Kent) rolls all roads, both great and small. Very few of the surveyors referred to can give any idea of the cost of rolling; some give ½d. per square yard, and one says it sometimes costs as much as 1s. per square yard, whilst in another case it is given as from 9d. to 1s. per *cube* yard! Where steam-rolling is habitually done, it is believed that the cost averages about 8 per cent. of the remainder of the cost of maintenance, and this would be a far more accurate mode of estimating it than by the cube of stone or superficies of road. The majority of counties do not roll the country roads, and though they save in one respect, they lose in another,—wear and tear of carriages, harness, horse-power, and stone, which probably more than counterbalance the supposed gain, and produce also vexation to body and mind.

The last question about commission was, perhaps, a somewhat awkward one to answer; there appears to be great diversity in the mode of payment of these surveyors, and doubt whether and in what way they can receive commission as well as salary, but none apparently receive commission from the County Councils for the work they render to the roads, though many get it for new works of other kinds, some for all new work, others for new work only of a certain magnitude.

The establishment of the County Councils Association has probably been the most important act of the past year, and result of the Local Government Act of 1888. Comprising in its Executive Council some of the clearest-headed men in the country, we venture to predict for it a future of great power and of immense advantage to every one. Those few counties who have not yet joined it will probably find the small expense of association well repaid by the valuable statistical information which it will be able to collect and disseminate, and those who are yet more or less ignorant on the important matter of roads which has been the subject of this article, will find the path to knowledge sensibly eased. It should also most certainly help to extract the County Councils from the chaotic state in which they still are in respect to the management of their roads.

NOTES.

WE have before us the draft copy of an appeal which the Architectural Association is about to issue to the profession for assistance towards a fund for enabling them to start on a secure financial basis the extensive system of architectural education which the Association has formulated. A quotation from a portion of the statement, as to the objects aimed at, and the liabilities they involve, will best place the matter before our readers:—

"The first step taken,—after the various changes had been decided upon, and the rules of the Association had been amended accordingly,—was to find suitable premises, where the work of the studio and classes could be properly and efficiently performed, for it was found impossible to obtain the necessary accommodation at No. 9, Conduit-street, where the Association has hitherto been housed. Very suitable premises have, however, been found in the immediate neighbourhood, and it has been decided to take them and fit them up at once, in preparation for the opening of the session in October.

To acquire, alter, and fit up these premises, a sum of 800*l.* at least is required, and to meet this and other expenses, and put the Association on a sound financial basis, it is thought that a capital sum of not less than 2,000*l.* should be raised. Several contributions and promises of financial support have already been received, but, as the question of the training of students is of great importance to all who have the interest of architecture at heart, it is confidently hoped that the remainder of the sum will be quickly subscribed, and that the Association may not be hampered by debt at the present important juncture.

The rent of the premises named is 160*l.* per annum, and there are also rates, cleaning, lighting, and heating to be paid for, say 190*l.* The estimated fees to be paid to lecturers and masters will amount to about 700*l.*, making a total annual expenditure of 1,050*l.* to be chiefly met out of the fees charged to students.

It is intended to charge each student a fee of 10*l.* 10s. for the whole course each session, or a proportionate fee for a part of the course. If 100,—*i.e.*, 25 in each year,—students join, the expenses will be met; but since it is possible that for the first year or two, until the advantages offered are better known, this number may not be reached, a guarantee fund has been founded to meet any deficiency that may thus arise during the next three sessions. Promises towards this fund are earnestly requested.

One of the chief features of the new scheme is the establishment of a studio, where the student will be encouraged to consider design and construction in their due relations to one another, and where he will prepare working and detail drawings; and the Committee hope to be able to secure the assistance of eminent architects to act as visitors."

The formation of a museum of casts and models for study, and of a reference library, is also under consideration. The Association has already received several liberal donations towards this large and spirited scheme, Mr. Waterhouse heading the list with a donation of 100 guineas towards the general fund; Mr. H. L. Florence has contributed a similar sum towards the fund for a library, and liberal donations have also been promised from Messrs. Leonard Stokes, Aston Webb, F. T. Baggallay, and other well-known members of the profession. We desire to express strongly our appreciation of the earnest and public-spirited action of the Association in endeavouring to further the cause of architectural education, and we hope that this effort will meet with the support from the profession at large which it certainly deserves.

FROM Harvard University comes a very important contribution to the now notable controversy on the Greek stage. Mr. J. Williams White sends a pre-print from the "Harvard Studies in Classical Philology," Vol. II., entitled, "The 'Stage' in Aristophanes." The thesis he is prepared to maintain is briefly this,—that the comedies of Aristophanes could not have been performed on the stage of Vitruvius. "The stage in a Greek theatre," Vitruvius says,—as most people now know,—"should not be less than 10 ft. nor more than 12 ft. high." He also says that the actors performed on the stage, the chorus in the orchestra, and this last statement is repeated by Pollux. The archæological evidence on this important point we have often touched upon. Scholars and archæologists alike are now looking eagerly for the completion of the excavations of the Megalopolis Theatre, and the full statements of competent authorities on both sides as to the deductions to be drawn from it. Meanwhile there is the literary side of the argument which no one can afford to neglect, and, as Mr. Williams White points out, it is generally agreed that the lexicographers and scholiasts must be practically abandoned; we must depend upon the evidence furnished by the Greek dramas themselves. The most bewildering confusion of terms and conceptions pervades the writing of the lexicographers and scholiasts; and yet through all this confusion may be traced the dominant belief in the existence of a stage. The last fact proves no more than that this belief arose and became fixed before the time of the later writers. Mr. Williams White begins with Aristophanes, but he promises us before long a similar examination of the plays of Æschylus, Euripides, and Sophocles. The main bulk of his pamphlet is given naturally to purely literary evidence, which we cannot resume here, but his introductory remarks and statement as to the architectural evidence of the excavated theatres (excepting Megalopolis) may be recommended to those who are not posted up to date.

AN important discussion on the question of classification took place at last Tuesday's sitting of the Railway Rates Inquiry. The traders suggested that the classification, as amended by the Board of Trade, should be accepted as a reasonable compromise between their own proposals and those of the Railway Company's, both parties withdrawing any further amendments. The counsel for the Company, however, did not fall in with the suggestion, and successfully resisted it. The classification, as submitted by the Board of Trade, differs very widely from that drafted by the Companies; and, although many of the alterations were the result of agreements between them and the traders, others were only adopted under strong protest by the railway interest. It is not surprising, therefore, that they should seize every opportunity of endeavouring to get their own proposals restored. It was intimated that they only intend, at this stage, to press a few points to which they attach considerable importance. They succeeded in carrying the first amendment they submitted to the Committee, which will enable them to require a minimum load of four tons instead of two tons for the goods comprised in class B,—four tons being the minimum originally proposed by themselves. At that time but few articles were included in this class, whereas in the revised classification it contains more than double the number (including sub-divisions). It is probably in consequence of several important reductions having been effected by this transfer of merchandise from higher classes, that the minimum originally demanded is now conceded.

THE death of Mr. Alexander Peebles, the City Architect, which is mentioned in another column, will be heard of by many of our readers with great regret. Referring to the vacant office, the *City Press* says:—

"Now that the Court of Common Council have lost their Architect, it is to be expected that the question that was fought at the time of the election of Mr. Peebles will again be considered. It will be remembered that at that time there was a strong feeling that the Court would do well to abolish the office of Architect, appointing a City Surveyor, on the understanding that when any work of special importance had to be undertaken, designs should be invited from eminent architects not officially associated with the Corporation. There can be but little doubt that the Corporation would act wisely in adopting such a course."

We have before urged the same view in regard to official architectural appointments and official architecture. It by no means follows that the man best able to carry on the generally somewhat routine business of an architectural adviser and surveyor to a corporation or company is at the same time a man of architectural genius; indeed, the reverse is likely to be the case, as men of artistic temperament are generally rather indisposed to the prosaic duties which mostly fall to the lot of an official architect; and even if he were, it is not desirable that all buildings erected under a corporation should be stamped with one unvarying character. It is far better for architecture that they should be the work of varied minds and varied tastes. The ill-effects of the system of official architecture have been unfortunately illustrated lately in the erection of various post-office buildings by the Office of Works, all stamped with the same expression of architectural commonplace.

THE twentieth volume of the *Transactions of the Institution of Civil Engineers of Ireland* contains a paper by Mr. W. G. Strype on "The Prevention of Waste or Misuse of Water in Towns." There are three distinct sources to which waste or misuse of water may be traced: 1st, leakages in dis-

tributing mains; 2nd, leakage in the house connexions and fittings; and 3rd, waste by consumers allowing the water to run away; and the author explains how, in the case of the town of Wicklow, these several causes of loss were discovered by the use of Mr. Deacon's meter and his system of detecting waste. Full particulars of the system and a detailed description of the apparatus will be found described by Mr. Deacon in Vol. XLII. of the *Proceedings of the Institution of Civil Engineers*. A long discussion followed Mr. Strype's paper, in which the President took an active part and contributed much useful information, including the result of a series of experiments he had undertaken to ascertain the quantity of water that can escape through small leaks in lead service pipes, from which it appears that with a water-pressure of 56 lbs. per square inch no less than 206 gallons per day of twenty-four hours will pass through a small hole, made with an ordinary pin, in the pipe; through an aperture of $\frac{1}{16}$ in. diameter, pressure 58 lbs., the discharge was at the rate of 524 gallons; when the aperture was increased to $\frac{1}{8}$ in. diameter, the waste was 2,880 gallons for twenty-four hours. All these experiments were made with a $\frac{1}{2}$-in. pipe, within 25 ft. of a 6-in. service main. Dealing with larger orifices, the President found that the waste through a $\frac{1}{2}$-in. tap was 16,416 gallons, and through a $\frac{3}{4}$ in. tap as much as 27,360 gallons during the twenty-four hours, the pressure in both cases being 59 lbs. per square inch. The last instance represents a cost of 250*l.* per annum, taking the price of water to be 6d. per 1,000 gallons. Among the other papers published in this volume may be mentioned one by Mr. R. Manning, on "The flow of water in open channels and pipes," in which most of the more important formulæ in connexion with the subject are examined and compared. Mr. J. P. Griffiths also contributes a paper on "Standard Tests and Specifications," which is well worthy of careful consideration.

A RECENT number of the *Chicago Times* gives an illustration of another of the great tower-like buildings which will apparently become before long a characteristic feature of the architecture of United States cities. It is called (in the new language the Americans are inventing) "The Germania Theater Building," and is to be erected by a syndicate of Germans resident in Chicago. The design is not deficient in architectural power. At the base is an entrance-screen in two stories running across the whole frontage, the ground-story showing a wide entrance with columns, and a shop-front on each side, with a niche for a colossal statue between the shop and the entrance on each side. Above this is a richly-decorated arcaded loggia with a cornice about 30 ft. from the ground (judging by the scale of the figures introduced). Behind this rises an immense tower divided by piers into three vertical compartments arched at the top; between the piers are the windows, plainly treated and all alike, showing twelve stories in this portion of the building. The top of the tower is finished by a band of richly-decorated wall-surface including another open loggia, furnishing a further story, and above is a widely-projecting cornice with a decorative balustrade over it. A small lantern with a cupola rises from the middle of the roof. The side portions of the tower are kept at about half the height of the centre, with similar but smaller enriched cornices stopping against the sides of the main tower, and treated in front with a lofty bay running nearly the whole height of this portion, and finishing with a balcony beneath the top story. Behind the tower a lofty block of building, also with a large enriched cornice just below the level of the main lower cornice, runs back and connects the composition with a similar tower at the back of the site. The Chicago paper (like too many English newspapers in this respect) does not trouble its readers with the name of the architect.

Old Timber House, Drogheda: removed in 1825.
(*From an illustration in the Journal of the Royal Society of Antiquaries of Ireland.*)

WE have received from Messrs Büsscher & Hoffmann, of Eberswalde, an illustrated pamphlet of their method of applying asphalte in sheets or tablets ("plaques d'asphalte") either for the covering of roofs or for the formation of an impervious layer against damp. These plaques were patented by the inventors in 1855, and have been since then considerably improved. They are composed of asphalte bound together by a fibrous tissue (the nature of the fibre is not stated), which is stated to considerably augment the resistance of the asphalte to breakage or cracking from any kind of strain. According to experiments tabulated by the patentees, a plaque of this kind will bear a tensile strain extending its length in the proportion of ·04 without the plaque suffering any injury or any breakage of continuity, but they state that official experiments made at the École Polytechnique of Berlin have shown the material to have an extensibility under tensile strain ranging from ·1 to ·2 of the entire length. The advantage of such a material in building operations is that it can be laid, the plaques overlapping each other at the joints, or made with halved joints, with the same facility as slates, and a defective piece taken out and replaced at any time. According to letters and testimonials included in the printed circular of the patentees, the material appears to have been extensively used in Germany with satisfactory results, and it certainly seems worth the attention of architects in this country.

THE fire at Lord Romilly's residence, caused by the upsetting of a paraffin oil lamp, is similar to many that have already occurred. But the position of the gentleman who lost his life through the accident has caused public attention to be directed to it more closely than would otherwise have been the case. There are some practical points which this accident suggests. The first is that if people are to go on using,—as they certainly will do,—mineral oil, it should be used in as safe a manner as possible. In other words the lamps should be constructed so as to be as little liable as possible to be overturned, and should be placed as far as possible out of reach. At present lamp-makers produce lamps of various forms and sizes, and in many fantastic shapes. A large number of these lamps are of a very unstable design. A lamp as nearly "unoverturnable" as may be should be the object of the practical lamp maker, and the prudent householder should take care that he obtains lamps which are thoroughly well balanced. It is equally obvious that hanging lamps or those placed on wall-brackets are safer than those standing on tables,—especially on small tables, which are probably the most dangerous of all. Of course, the nature and standard of the oil used is very important, but this point is one which has nothing to do with the construction and position of the lamps.

THE last issue of the Quarterly Journal of Proceedings of the Royal Society of Antiquaries of Ireland contains an article by Mr. W. Fraser on "Half-timbered Houses in Dublin and Drogheda," with one or two illustrations. According to Mr. Fraser, all work of this class in Ireland has been destroyed, the last timber house of any note in Drogheda having been pulled down in 1825. We give a reduced representation of this curious house from the cut given in the Society's Journal. The material was Irish oak, and the house bore the inscription on the bressumer: "Made . by . Nicholas . Bathe . in . the . year . of . our . Lord . God . 1570 . bi . Hiv . Mor . Carpenter." Each word was divided by a star. The last of the Dublin street houses of timber was removed a few years earlier; an illustration of it is also given. It bears a considerable resemblance to various old London houses of the same class.

BY instructions from the trustees of the Earl of Hardwicke's Estate Act, the home portion of the Wimpole estate, in the counties of Cambridge and Hertford, is placed in the market. This property extends in all to nearly 10,260 acres; the deer park, in which is a fine avenue, nearly $2\frac{3}{4}$ miles long, of elm trees, lies just north of the old Roman-road from Arrington Bridge to Barton and Cambridge. Wimpole comprises various manors that eventually came into possession of the Chicheley family, who settled here *temp.* Henry VI. From John Chicheley of Higham Ferrers, the archbishop's great-nephew, they passed to Sir Thomas Chicheley, who in 1686 sold them to Sir John Cutler. In 1710 the property was bought by John Holles, Duke of Newcastle, of Lord Radnor, who had married Cutler's daughter. Philip Yorke, Lord Hardwicke, and Lord-Chancellor, bought it, in 1739, of Edward Harley, second Earl of Oxford, and his wife, only daughter and heir to the Duke. The central portion of the hall, of brick, was built by Sir Thomas Chicheley *circa* 1632: Lord Oxford added two wings, and employed Sir James Thornhill to paint the chapel. Lord Hardwicke had the house newly fronted, and re-fitted the principal rooms. In 1791–2 some alterations and additions were made by Sir John Soane. Prior, the poet, frequently visited here in Lord Oxford's time, and his portrait was added to the gallery, which already contained Van Dyck's Richard Earl of Warwick, Jansen's Ben Jonson, and Kneller's Bishop Burnet. In the St. Andrew's parish church, as rebuilt, excepting the chantry chapel, in 1749, of red brick, after Flitcroft's designs, is Scheemakers's monument, with medallion portraits, of the Lord Chancellor Philip, his wife, and their son Charles (also Lord Chancellor, who died before his patent as Lord Morden was completed) executed after J. Stuart's design. There are other monuments to the second Earl, his brother Joseph, elevated Lord Dover, and, in the chapel, to Sir Thomas Chicheley, who died in 1616. The windows contain several coats-of-arms, by Pecket, of the Yorke family and their alliances. Most, if we remember aright,

of Lord Hardwicke's collection of pictures from Wimpole, were sold at Christie's on June 28-30, 1888. The sale included Hogarth's and Sir James Thornhill's painting of the House of Commons in 1730, with portraits of Speaker Onslow, Sir R. Walpole, Sidney Godolphin, and Sir James Thornhill,—who sat for Weymouth,—(Thibaudeau, 105 guineas). Also the following, bought for the National Portrait Gallery:—Kneller's portraits of Thomas Parker, Earl of Macclesfield, and Charles Montague, Earl of Halifax; and Benjamin Ferrers's painting of the Court of Chancery in Westminster Hall, *temp.* George I., with portraits of Lord Chancellor Macclesfield, Sir Philip Yorke, then Solicitor-General, and Sir Thomas Pengelly, King's Prime Serjeant (115*l.* 10s.). Dr. Lort gave this last picture to Lord Hardwicke. A view of the Hall will be found in Vol. I. of Moule's "English Counties Delineated," 1837.

SOUTH VILLA, in the Inner Circle, Regent's Park, has been placed in the market for sale by private treaty. The grounds, 10½ acres, together with those of the adjacent St. John's and the Holme, extend to the lake in the park. It is of interest to note that at this villa Mr. George Bishop, F.R.S., built for himself an observatory in 1837. There during many years Mr. J. R. Hind conducted his observations of the asteroids between the orbits of Jupiter and Mars, his labours being rewarded by the discovery of ten, beginning with Iris on August 13, 1847, and ending with Urania on July 22, 1854. St. John's, long known as the residence of the late Sir Isaac Goldsmid, and now the Marquis of Bute's, was for the most part designed and built, in 1830-1, by Decimus Burton, who built also St. Dunstan's Villa, 1832-7,—the late Lord Hertford's,—Holford House for Mr. James Holford, 1832-3, now the Regent's Park, late Stepney, College, and laid out the Zoological (1826-40) and the Botanical Gardens (1840-59). James Burton, his father, designed and lived in the Holme. About sixty years ago J. Wilson Croker went to St. Dunstan's for a day's sport in the park, where at that time were hares, pheasants, and partridges.

WE have received a photograph of the trowel with which the Queen laid the foundation-stone of the Derbyshire General Infirmary (illustrated in our pages last week) on Thursday the 21st. The trowel was made by Messrs. Johnson & Son of Derby, from a design furnished by Messrs. Young & Hall, the architects of the building. The trowel is made of solid silver gilt, and the handle of ivory, with a bas-relief of "Charity" cut out of an oval sinking in the handle so as not to project beyond the general outline of the handle; the sinking, with a slightly-raised fillet, forming a frame to it. The handle is surmounted by the Imperial crown. The face of the trowel is decorated with delicately-chased scroll-work with the Royal Arms in the centre and the county arms below, and on either side small engraved figures representing respectively St. Luke and Æsculapius; round the margin is an inscription commemorating the occasion. This is a better and more artistically-designed work than ceremonial trowels, keys, &c., made for such occasions, usually are, it is in good and refined taste throughout. The only little point we object to is that the two quatrefoil leaf-forms which make the attachment of the handle to the blade do not harmonise with the circular lines of the head of the blade; they should have been made circular and have been worked into the lines of the blade and its decorative scroll-work; as it is they do not appear to fit their place. But it is gratifying to see so good an attempt made to introduce artistic style and refinement into an implement of this kind.

IN our column of Foreign news, under the head of "France," we have the pleasure of announcing that Mr. Waterhouse has just been elected a Corresponding Member of the Académie des Beaux-Arts of France,—another among various proofs of the estimation in which his character and abilities are held on the other side of the Channel.

ARCHITECTURE AT THE ROYAL ACADEMY.—V.

1,791. "Trinity United Presbyterian Church, Pollockshields, Glasgow;" Mr. W. G. Rowan. Rather a novel and effective treatment of the end of the church, which is flanked by two lofty octagonal turrets, solid below, and rising into open-work stages above. A well-executed pen drawing.

1,794. "St. Mary's Church, Stamford; Chancel Screen;" the late John D. Sedding. A water-colour drawing of an elaborate rood-screen with the usual open arcade, traceried heads, and cornice carried out on imitation vaulting; but above this is another stage with a second cornice, and seated figures in front of a background of rich panelling; the centre compartment is raised and has a crucifix with two figures standing beneath the arms of the cross. The effect of the whole is fine and original.

1,795 "New Premises, Chester;" Mr. T. M. Lockwood. An angle group in one of the Chester Rows; the portion adjoining the angle is treated in masonry in more or less Elizabethan style, with open circular arches to the Row; at the two extremities of the composition the timber work characteristic of old Chester is introduced, and the Row openings are covered by wooden lintels. The treatment is varied at each end. The effect of the whole is picturesque and the drawing, tinted in sepia, a good one. We presume no local Building Act interferes with the modern adaptation of half-timber architecture in the streets of Chester. Architecturally this is a gain for the moment; it may be doubted whether it is best in the long-run, either for the sanitary condition of the city or for the value of the property.

1,797. "The Nativity: painted in the centre of a triptych at St. Paul's, Wilton-place:" Mr. N. H. J. Westlake. Illustrated in our present number (see lithograph). A pencil drawing of a well-composed group, in which the faces and draperies have been carefully studied, but the infant Jesus is a figure of rather stiff and Mediæval character, a criticism which does not apply to the rest of the composition.

1,798. "Zephaniah: Twelfth-century Byzantine Mosaic, Daphne, Athens;" Mr. R. W. Schultz. A companion drawing to No. 1,773. The drapery is much more free and classical in style, and less diversified with colour and ornament than in the other case.

1,799. "Whittington Hall, Staffordshire, Restoration;" Mr. M. H. Holding. A pretty pen drawing of an interesting old house partly castellated in character and partly half-timber in another wing; but there is nothing to show wherein the "restoration" consists, or what is old and what new.

1,802. "Scheme for Decoration in Coloured Gesso;" Mr. H. W. Batley. A clever little upright panel of a marine *motif*. There is a base ornament with a row of conventional shells, over this the surface is diversified by flowing lines conveying the idea of water, and two little sea nymph figures appear to float on it, crossing each other. Above is a bit of wall ornament and a wreath. A pretty fancy worked out in a decorative manner:

1,804. "The Tower of the Church of St. Jean, Maestricht;" Mr. John B. Gass. A carefully-drawn elevation and section, which we had the pleasure of publishing in the *Builder* of December 3, 1887.

1,805. "Design for a Hall: Interior;" Mr. J. Armstrong Stenhouse. A small coloured perspective of a "marble hall" of Renaissance detail, of spirited and free design; evidently intended as the lower hall to the staircase interior shown in No. 1,777.

1,806. "Crooksbury near Farnham;" Mr. Edwin L. Lutyens. We presume this is a new house, though it is made to look very much like an old one both in style and in the manner of drawing. It is decidedly picturesque; an L-shaped house, one return with plain stone walls and small cottage-like windows, the other partially half-timber work. A plan is added. We should imagine some of the rooms rather insufficiently lighted, though the small windows look very pretty and homelike from the outside.

1,807. "Design for choir-stalls, St. Albans Church, Teddington;" Mr. A. H. Skipworth. A very delicately-executed tinted elevation of richly-worked choir-stalls and canopies of Late Gothic type, with much elaborate tracery The backs of the stalls are decorated in colour, apparently textile work. The details are all such as may be taken from old Gothic work. Rather a pity that the designer of a thing in such good taste should not also have endeavoured at some little modern and original treatment in the architectural detail, which might have been done without necessarily putting it out of harmony with the building in which it is placed.

1,809. "Design for an altar cross, silver gilt enamelled;" Mr. G. P. D. Saul. A large and elaborate coloured drawing, which however we cannot very much admire. It shows a Latin cross expanding into a square at the ends of all four arms, the squares bearing the emblems of the evangelists. As the lower one is the foot on which the cross stands, it looks awkward to treat it in the same way as the extremities of the other three arms; and the base on which the whole rests, with small lions for feet, is somewhat squat and ungraceful in form. The manner in which open metal work is used to form a kind of circular nimbus round the centre of junction of the arms of the cross is the best part of the design. The figure of Christ is placed so that the head forms the centre of this nimbus. The central portion of the ground of the cross and of the four square panels is filled with blue enamel which has rather a gaudy effect.

1,812. "New Offices, Fenchurch-street;" Messrs. Maclaren, Dunn, & Watson. There is some originality of detail in this pleasing little coloured elevation, especially in the manner in which the long pilasters, running through the first and second stories, break off at the top into spreading foliage, instead of ending in an ordinary capital. The ground story is of grey granite (?), the upper part of cream-coloured stone, with large circular-headed windows on the first and second stories, and square-lined windows forming a kind of attic over, in which a certain novelty of detail seems suggested in the architraves, but too slightly sketched and on too small a scale to say exactly what is intended. There is however both good taste and originality in this elevation, unpretending and quiet as it is.

1,813. "Carved Boss from Chapter House, Southwell;" Mr. A. H. Powell. Noteworthy as a very good bit of colour.

1,816. "Detail of new Reredos, St. Peter's Church, Bushey Heath, Herts;" Mr. Jas. Neale. A section should have been added to explain the treatment of the pinnacles and buttresses &c., which is not quite evident from the elevation. The architectural portion of the design consists of rather heavy but solid-looking crocketted gables with a cornice rising over them, the top battlemented finish of which does not seem quite in keeping with the rest of the detail. The architectural design leaves three compartments over the altar, painted with the figure of the Saviour in the centre and angels in the side compartments, presumably intended for mosaic; the colouring is rich and harmonious. The symbols of the Evangelists are worked into double triangles in a panel at each side, forming a kind of supplement to the main composition.

1,817. "Chartres Cathedral: West Doorway;" Mr. H. Wilson. A slightly-executed but able water-colour sketch of the sculptured portal and its figures. Is the door itself really as green as represented here? It serves to give the key-note for a certain special colour-tone in the drawing.

1,819. "Additions to Grove House, Harrogate;" Mr. Butler Wilson. Two well-executed pen drawings, of which the one shows a house with a picturesque arrangement of gables and half-timber work, the other, showing the other side of the same house, shows a more square and formal architecture. A plan is appended, on which the distinction between the old and new work is apparently indicated by light and dark tinting, but the drawing is hung too high to make it out, or its reference to the perspective views.

1,818. "West End, St. Michael's, Smethwick;"

Mr. A. E. Street. This is apparently the church the font from which is illustrated in drawing No. 1,880 in the exhibition (published among our plates this week). The west end of the church shows a square brick tower rising from the ground without plinth or base moulding, and perfectly plain except for an arcade in the upper story, diversified by the introduction of stone courses in alternation with brick. Over the tower, rising from behind a parapet, is a short red-tiled spire. There is a certain severity about the design, partly suggesting the idea that economy has ruled in its production; but the low lean-to piece of building across the front is awkward and unsightly in appearance, and we cannot very much admire the work as a whole.

1,822. "Proposed house to be built at Hampstead;" Mr. R. A. Briggs. This is a very good specimen of the revival of the style of the old London suburban house, with rusticated door pilasters and angle-quoins, and diversified by a rather original treatment in the semicircular bay windows in each wing, with apparently solid stone roofs (segmental in vertical section), and columns between the windows. If these bays have, as appears by the drawing, jointed stone roofs, how is it intended to keep wet out? Between the wings and the narrow projecting centre are recesses with columns in front on the ground floor, leaving balconies over. The whole effect is at once solid and picturesque, and the drawing (in pen-line) a good one.

1,821. "St. Mary's, Stoke Newington: Tower and Spire;" Mr. John O. Scott. A large pen-drawing of an adequate modern Gothic tower and spire, presenting no features out of the common; it is of course well done, but we fear this reproducing of Gothic towers and spires is getting rather played out now. The best point in the design is the junction of tower and spire, the low octagon angle-turrets with their high pinnacles producing a good effect. The lucarne windows at the base of the spire are made of some importance in the grouping, with high pinnacles over them growing some distance up the face of the spire.

1,824. "St. Antonien Kapelle, Berne: as restored;" Mr. Reginald Blomfield. This is a fine bold sepia drawing of an old building restored to what we presume the architect believes to have been something like its original condition, and (unlike many other exhibitors of "restored" drawings) he adds a small sketch in the corner showing the state of the building before he dealt with it. It shows there a curious massive battered basement and a low story with ordinary square sash-windows above, apparently cut short by the modern flat roof with projecting eaves. In the restoration this part is carried to double the height, and the windows finished with pointed arches and tracery in the heads, but with the lights divided up into small square panes; the wide projecting eaves are retained, but with a high-pitched roof over them, and a flêche at one angle. It is an interesting bit of picturesque architecture shown in a very effective drawing.

1,825. "North-east view of St. John's Church, Cardiff;" Messrs. Kempson & Fowler. A solidly-executed pen-drawing of a large Gothic church of orthodox type with a square tower, very plain except for the richly-treated and picturesque parapet and open angle-turrets. The plan is an unusual one, the nave, with five aisles, spreading out wider than its length; it ought to produce a good interior.

1,827. "Proposed Country House, Cheshire;" Mr. E. Hodkinson. A good water-colour drawing of a bold-looking red-brick house with two large gables to the front, and a wide round-arched recessed porch, which gives a hospitable expression to the building.

1,828. "The Red Drawing-room, Aston Hall, Birmingham:" Mr. Alfred E. Hewitt. A good water-colour showing the interior of (we presume) an old room, chiefly remarkable for its rich and elaborate plaster ceiling.

1,829. "Parish Church of Waterloo, Lancashire;" Messrs. Paley & Austin. One of the finest pen-and-ink drawings in the room, remarkable for its clear and bright effect (the result of clean lines, touches put in where they are wanted and nowhere else, and plenty of untouched spaces), and exhibiting one of the best bits of modern Gothic in the exhibition. Observe the massive effect obtained by simply producing the side walls into buttresses at the east end, with nothing to break the line of wall. Though the style is Mediæval Gothic, there are touches of modern feeling in it, as in the employment of circular or rather elliptical heads to the tracery-lights in many places. The nave is lighted by large clearstory windows under horizontal labels, but the spandrels filled up with solid tracery; the buttresses shallow and wide and ending in a simple set-off. The tower is a very fine and solid one, square in form with a large staircase turret at the south-west angle; the upper stage with windows in double lights in two stages, or rather a four-light window, very simply treated with mullions and segmental heads to the lights, which are filled with louvre-boards. The parapet is richly decorated with panelling and tracery. There is a look of solidity and dignity about the whole, combined with some richness of effect, which is most satisfactory.

1,830. "Head Office of the Hong Kong and Shanghai Banking Co., Hong Kong;" Messrs. Turner & Palmer. This perhaps merits notice as a building carried out in China with Classical details, but it is a curious affair. The finials seem to have been designed with some intention of giving an exotic and Pagan-temple effect to a building mostly made up of the ordinary materials of Classical banks; at any rate the effect of the whole is odd and unwieldy.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

The fourteenth ordinary meeting of this Institute for the present session was held on Monday evening last, at 9, Conduit-street. Mr. James Macvicar Anderson (Vice-President) in the chair.

Obituary.

The Secretary announced the decease of Mr. Harry Oliver, Fellow; Mr. Alexander Peebles, Fellow; Mr. Thomas Verity, Fellow; and Mr. Henry Curzon, Associate.

The Chairman said that fortunately it was not often they had to regret such a large number of deaths, which were partly the result of the influenza epidemic. He was sure all the members received the announcements with very deep regret. Mr. Verity he happened to know a little of. Having had one or two transactions in business with him, he had formed the opinion that he was an extremely straightforward and able man—a man in whom he had the utmost confidence. Mr. Peebles he had not the pleasure of knowing personally, but he filled a very important and prominent position—that of City Architect—although only for a short period, and it was a singular coincidence that he seemed to have died on the fourth anniversary of the death of his predecessor, their old friend, Sir Horace Jones. Mr. Harry Oliver he remembered as having been a member of the Council in days gone by. It was with very great regret that they had to make the intimation of so many deaths.

Some Churches in the Neighbourhood of Cleves.

Mr. H. W. Brewer then read a paper on this subject, of which the following is an abstract:—

The author thought that no district in Germany had received less attention at the hands of the English archæologist and architect than the old Duchies of Cleves-Berg. Some twenty years back* he read a paper before the Institute upon the condition of architecture in Germany, and had expressed a hope that it had a great future; and signs were not then wanting of great progress. He was bound to acknowledge, however, that the modern architecture of Cologne showed little or no advance, for while architects in England had made great strides, especially in the adaptation of Gothic and Renaissance detail, the new street architecture of Cologne seemed to be devoid of any interest, and about on a level with that of Bayswater thirty years ago; while hundreds of fine mediæval Gothic and Renaissance houses, which had offered excellent suggestions for modern work, had been swept away to make room for dull and commonplace buildings. The one exception he noticed was a new gallery and staircase at the Hotel Dische. The old walls of Cologne had disappeared, but two old gateways had been spared.

The old abbey of Altenberg appeared to be better known in England than in Cologne; after numerous inquiries, he found it was sixteen miles distant, and after driving through a wild and picturesque region, on arriving at the top of a great hill, Altenberg was to be seen some 200 ft. below. His first feeling was one of disappointment. The west front was a somewhat hard and dry example of German fourteenth-century work. Some good sculpture was to be found, however, about the western doorway. Altenberg had been a Cistercian abbey, but all that was left of what must once have been one of the most stately abbeys in Germany was the great church, the abbot's chapel, and a few uninteresting farm buildings. The abbey church bore a remarkable resemblance to Cologne Cathedral; some German writers called it the "Parent of Cologne," and it had been set down as an earlier work of the same architect. But, although it looked the earlier of the two, it was not so, as the choir of Cologne had been commenced in 1248 and consecrated in 1322, whereas Altenberg had not been commenced till 1255, and its date of completion, as given by Kugler, was 1379. The whole design had a more northern treatment than that of Cologne, and he did not hesitate to say that, as far as the interior was concerned, Altenberg was the more beautiful.* Its noble proportions, stately dimensions, and the exquisite glass with which all the windows were filled, rendered it well worthy of a visit. Having described this glass in some detail, Mr. Brewer said he considered modern work would be far better for more of the architect and less of the painter; and that stained glass windows formed inappropriate memorials to the dead. Although Altenberg was almost denuded of furniture, the old altars remained, as well as a grand series of monuments to the counts of of Berg and mitred abbots.

In the ancient town of Neuss, the "minster"† was a noble example of architecture of the twelfth and thirteenth centuries. Its design was purely German. The plan showed a single eastern apse, with two others at right angles, all three opening from a crossing which was crowned by an octagonal lantern; to the west was a nave with double aisles, and a large square tower flanked by transepts. The arrangement of the choir was somewhat singular and also suggestive; it occupied the eastern crossing, but instead of the side apses being cut off by screens, the stalls were placed against the walls of the two apses, and the high altar was placed under the crossing. The treatment of the construction, interior and exterior, having been described, the author next dealt with the handsome old town of Emmerich, which was quite Dutch in its characteristics, especially referring to the two old churches called the "Old Minster" and the "New Minster." The former was singularly planned, and he could only describe it as a great north transept with a very small nave, a low chancel, and a short south transept attached to it. The whole building was of brick with stone very sparsely used; and quite Flemish in character. The chancel was probably tenth-century, and the north transept was, he fancied, fifteenth-century work. The other church consisted chiefly of a vast nave and aisles of the plainest fifteenth-century Gothic of the Dutch type, with a lofty brick tower crowned by a lantern. Except its great size, there was, however, nothing particularly interesting about it.

The town of Cleves contained three ancient churches, the principal of which, the collegiate church, crowned one of the hills, and at a distance was a striking-looking building. The date of its completion was 1334, and the material used in its construction was somewhat singular. The walls were of red brick with stone dressings; but in some places they were banded with a kind of artificial stone, which was used in such an irregular manner that it was a question whether it was not the material of some older building worked up. Another curious feature was that all the clearstory windows were blocked up, their traceries showing only on the interior. The old Dominican church in the lower part of the town was a very plain brick building of Dutch type, but containing an extremely beautiful set of choir-stalls. About three miles from Cleves was a village church called Wissel,—a most perfect example of an unaltered twelfth-century building. The modern German decorative painter had unfortunately had full scope here, and the walls were covered with the horrible metallic green

* See *Builder*, vol. for 1871, p. 918.

* For description and interior view of this Abbey Church, by Mr. Brewer, see the *Builder* for June 21, 1890.

† Or Church of St. Quirinus. For description and exterior view see *Builder* for June 9, 1890.

and hot orange tones which seemed to delight German eyes.

Calcar was a pretty old Dutch-looking town with Mediæval fortifications of brick, and a lofty but very plain church of Flemish appearance. It was probably one of the most richly-furnished churches in the whole of Europe, and contained seven altars, each with a most magnificently carved and painted reredos.* It was impossible to see the carvings and paintings at Calcar and other churches in the neighbourhood without being impressed with the fact that the school was one that possessed great merits, and that well deserved study.

About eight miles from Calcar was Xanten. The author considered it scarcely an exaggeration to say that Germany did not contain a more interesting church than the minster of St. Victor in that town; and having referred to other buildings in the town, he proceeded to describe very fully both the exterior and interior of the minster.† The plan deserved especial attention, on account of the arrangement of its eastern termination, which was a very valuable and interesting example of the problem which the German architects at the end of the thirteenth century tried to solve,—viz., "how to terminate a church to the east by a group of apses in such manner as to avoid the French *chevêt* and radiating chapels." The nearest approach to a solution was the Liebfrauenkirche at Treves, the eastern portion of which was almost identical with that of Xanten, and of which Xanten was, perhaps, a copy. The author dealt at some length with this subject, and then turned to the interior of the minster, which, he said, was wonderfully striking, with the clustered columns, richly carved capitals, enriched cornices, lofty clearstory, noble vaulting, the beautiful perspectives produced by the double aisles, the stained glass, and the magnificent old church furniture, all of which were described in considerable detail. He also drew attention to the great beauty of the roofs of the church and adjacent buildings, a good deal of the slating of which he believed was original. The high-pitched roof of the nave was adorned with very pretty dormers with lead finials, the slates being all laid obliquely with those covering the flashings scalloped and reversing the general line. In contrast with modern English roofs the Germans evidently studied their roof-coverings carefully and treated them artistically. It puzzled him to determine to what particular school the architect of Xanten had belonged, but he fancied he must have been a South German; and as Xanten had been a famous pilgrimage church, it was highly probable that the architect had been called in from a distance.

Mr. Charles Fowler proposed a vote of thanks to Mr. Brewer for his interesting paper. He had taken them to a district with which probably very few were acquainted, and he (Mr. Fowler) did not intend to make any remarks upon the paper. There was one remark, however, in it with which he thought most of them would not agree. Mr. Brewer regretted that the modern, or at least recently-built, spires of Cologne Cathedral were not put upon a modern building instead of upon an ancient one. Mr. Brewer was aware, as they all were, no doubt, that those spires, although carried out in modern times, were of ancient design which had been almost miraculously preserved, and were carried out, he believed, exactly as was originally intended. They could hardly wish that spires or towers should be put anywhere than in the place for which they were originally intended. As to the effect of those spires, that was quite another matter. They did not admire all the ancient buildings which were erected, but certainly it was interesting to know that those spires and towers should have been completed according to the original design.

Col. Lenox Prendergast, Hon. Associate, said he would like to be permitted to second the vote of thanks to Mr. Brewer, whose paper was one of the most interesting he had ever heard read. Within his (the speaker's) own lifetime there had been a great development of Gothic architecture as applied in modern work; but to go into almost any of their own churches and see the interminable rows of admirably-executed open benches was to see a very tame and dull representation of what those great buildings originally were. Mr. Brewer had laid before them the peculiarities,—in fact, the *raison d'être*,—of those great Catholic buildings. The Catholic churches of old times contained a multitude of altars and a great amount of furniture. From a variety of causes these altars and furniture had been swept out of the great churches of Christendom. Alone apparently in such districts as that visited by Mr. Brewer would they find the churches as they originally were. Of all the destructive powers, wealth was, perhaps, the greatest. The changes of fashion had throughout the finest churches of Europe produced most admirable substitutes, it was true, but of a wholly different character to the churches as originally constructed. To him as a layman he confessed that he had often wondered to see, especially in the late Gothic churches of Germany and the Low Countries, such enormous pillars and architectural features, which appeared to him to be too bare, the truth being that those churches were now seen denuded of the furniture which they were intended to have, and, perhaps, did have at one time. There was just one question he would like to ask Mr. Brewer. There was a great deal of Renaissance furniture which found its way into these churches, and very interesting it must have been. He derived his knowledge of it from the admirable drawings by Mr. Brewer, which had appeared in the *Builder*. He could see that it was not with the sole object of showing the furniture that those drawings were made: but they showed some most beautiful Renaissance triptychs and altar furniture, of which we had so few examples. He would like Mr. Brewer to state whether he was right in supposing that those features actually existed, and how they could get to see either photographs or drawings of those most interesting features.

Mr. Arthur Cawston asked what Mr. Brewer meant by the apses all the way round the east end of the cathedral not looking well? Was it because they did not show up when one went into the cathedral, or was it that when they got to them and examined them one by one the effect was not good? Mr. Brewer also made some remarks about the big high-pitched roofs one saw over the big churches not looking well. He (Mr. Cawston) thought if they were high up, like that of Westminster Abbey, they were very effective, whereas if they were large and low down, like that of Westminster Hall, they were indefensible, and should be hidden at all costs. If only the roof was high enough he was not sure that grand lines were not almost better than seeing no roof at all.

The Chairman, in putting the vote of thanks, said that Colonel Prendergast had very rightly described Mr. Brewer's paper as a most interesting one. He had the misfortune of not knowing personally the buildings which Mr. Brewer had so minutely and so ably described. He was struck with one plan which Mr. Brewer sketched on the blackboard, which was described as particularly ingenious, clever, and original, though it was added that in spite of these qualifications it had the demerit of not producing a good effect. He (the Chairman) thought that was a characteristic of a good deal of work where originality was strained after. He fancied that there prevailed in the present day too great a straining after novelty, and that beauty was sacrificed to originality. Beauty ought never to be sacrificed to originality. Originality was all right and good enough in its way, but if it could only be attained at the cost of beauty it had better not be attempted. Mr. Brewer had apologised in a manner for the severity of his strictures upon stained-glass. Certainly his strictures were somewhat severe; whether they were too much so he was not prepared to say. He thought, however, that artists in stained glass were very apt to forget, as Mr. Brewer had said, that they were dealing with glass instead of with paint, so that very frequently "memorial" windows were far from beautifying the buildings which they were intended to adorn. From what Mr. Brewer had said, it appeared that jerry-building was not peculiar to London. Mr. Brewer had told them that many of the old and interesting buildings in Cologne had been removed to make way for modern works in which the jerry-builder had full scope. They had many instances in London where buildings had been removed and replaced by modern and very inferior buildings. An apt illustration might be quoted at the present moment. They had been endeavouring to preserve a building of considerable interest, and one of the few buildings in London by one of the most accomplished architects of the present century; he referred to Professor Cockerell's Hanover Chapel, Regent-street. The House of Lords had, unfortunately, passed the Bill for the removal of the church, but it had yet to pass the House of Commons, and there was a chance of yet saving the building if sufficient efforts were made. Whether they would succeed or not remained to be seen.

The motion was then put and cordially adopted.

Mr. Brewer, in reply, said he had first of all to thank the meeting for the extremely flattering way in which they had received his paper. Of course he was not a practical architect, and he merely regarded architectural works from their appearance, as they would strike one of the public who had what were called artistic tastes. Therefore, in the buildings he had criticised there might be certain constructive merits and advantages which he was incapable of understanding. With regard to the spires of Cologne Cathedral, it was perfectly true that the original design of those spires was discovered by Zwirner. It was found in two different places; part of it in Paris, and part of it under a beehive in the neighbourhood of Cologne, and put together. But he (Mr. Brewer) was not quite sure, in looking at the drawing which now existed in Cologne Cathedral, that there was not a good deal of Zwirner in it, and he felt perfectly convinced of one thing, that the old men would never have carried out that design. He was borne out in saying that from a fact which he noticed at the Cathedral, and that was this, the north-western tower had very considerably departed from that design before the recent works took place. Part of these marks were destroyed, and he looked upon that as a great misfortune. The design, he could not help thinking, was merely a tentative one,—perhaps one of a dozen others,—and would have been modified if carried out at all. He thought he might say as a certain fact that there was no cathedral of any size in Europe which had two towers and spires precisely and exactly alike. At any rate, he had never met with one, yet those at Cologne were carried out exactly and precisely alike, and the monotony which they produced certainly struck him as being somewhat painful.* Colonel Prendergast had remarked about certain Renaissance furniture which had been introduced into these churches. There were photographs in the room which showed the high altar at Xanten, and the extreme beauty of its very early Renaissance detail. But, although they called it "Early Renaissance," its outline was purely Gothic, and it was only in later times, when men gave up the Gothic outline altogether, that the effect seemed to be something totally different; in fact, looking at those early Renaissance altars, one would, without examining them, put them down as late Gothic work, and in some cases, Gothic work was very much mixed up in them. There was one curious feature to which he had not called attention, and that was the old super-altar. There were one or two super-altars existing at Xanten. He had heard it stated as a positive fact that the super-altar never existed before the eighteenth century, but here at Xanten was one of the fifteenth century. This super-altar was a movable feature—simply a box which held the candles, and was a work of very great interest. With regard to the apses arranged according to the German plan, he did not wish to be understood to say that they did not look well, but he did not think they were so effective as the French *chevêt* with radiating chapels, though they might be made as effective if they could be seen from the interior of the church as well as the exterior; and if anyone could solve that problem he would hit upon a new plan of church which he believed would be more effective than the French *chevêt*, but it would require a very clever architect to do it. With regard to high-pitched roofs not being effective, he thought that a high-pitched roof was an effective feature, but it required to be treated with a very considerable amount of care not to look clumsy. He certainly had seen many high-pitched roofs which

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* For description and interior view of the church, by Mr. Brewer, see *Builder* for March 8, 1890.

† See the *Builder* for April 5, 1890 for view outside Xanten Gateway and view from the cloisters of the Church of St. Victor, Xanten; *Builder* for May 3, 1890, for interior view of the choir; and *Builder* for May 17, 1890, for view of altars in the south aisle, St. Victor.

* Some idea of the appearance of these spires may be obtained by the views given in the *Builder* for October 23, 1880, and May 8, 1881.

were extremely magnificent; those of the French *chateaux*, for instance, but then it must be remembered that they were broken-up with dormer windows and chimney-stacks. He thought a great unbroken high-pitched roof without any design about it was an unsatisfactory feature to crown an elaborate building.

Mr. J. M. Brydon: What is the colour of the slates?

Mr. Brewer said it was a very beautiful kind of grey, not unlike that which they found on old Kensington Palace. He was distressed when he heard of the proposed destruction of Hanover Chapel, which was the work of his old friend the late Professor Cockerell—to whom he really owed much, as he was exceedingly kind to him when he was a boy and greatly encouraged him in the study of architecture. He immediately upon hearing of that proposal wrote a letter to the *Builder*, and was thus, he thought, one of the first to call attention to the proposed act of destruction. In conclusion, he wished to thank the meeting once more for the kind way in which they had received his paper.

The proceedings then terminated.

HOME-LIKE HOUSES.*

THE love of home is an instinct possessed by man and the greater part of the animal world alike. It is perhaps the only sentiment which the reticent Englishman is not ashamed to confess to; indeed, it is his boast that the English language alone possesses the word "home" in its fullest sense.

Is it not strange, therefore, that, while all possess this instinct, the large majority of people are content to live in houses which are quite unworthy shrines of the household gods? The love of home exists still, but the love of the house has almost died out, or is lavished on a building which is quite undeserving. We have only to look round us and contrast the old houses with the new in order to see the truth of this.

Let us picture to ourselves the old Elizabethan house, quiet, dignified, and stately, as befits the age.

It is early morning on a bright summer day; the master of the house paces the long alley guarded by yew and box, or turns into the flower-garden, where the flowers, drenched with dew, give out a sweet, fresh scent; or it is late afternoon, and we see the head of the house sitting with his wife in the shaded arcade, while the children play on the terrace. The air is full of the scent of roses, and musical with the hum of bees; the shadows lengthen, the rooks sail slowly through the air; part of the house is in deep, cool shadow, and chimneys and gable-tops begin to glow like burnished gold. There is a sense of perfect rest and contentment; cares are forgotten for a time. Would it be wonderful if, in homes like this, men should grow noble and true, and the love of their home should become a passion? Can we wonder that they should cling to such homes, and feel that here indeed there is peace?

It is not only the mansion that fills its owner with delight. Take the farm-house on a summer evening, when the farmer is coming in weary with a day's toil in the fields. The cows are just being driven out into the fields after milking, and he hears the musical clatter of the milk-pails as he walks up the path, lined on either side with simple homely flowers in rich profusion. How cool the shaded kitchen looks, and how delicious is the faint smell of wood-smoke! He drops into his chair and is refreshed by the peace and quiet of home.

Old houses are all alike in this respect. How well we know the little prim house on the outskirts of a country town, standing back from the road, with a wall in front, and a high narrow iron gate with a straight path to the door. We grasp the spirit of the place at once, and know exactly what the owner is like; we can see all the furniture and china, and even smell the lavender and rose-leaves.

As we continue our walk, it is the same thing over again. There is the lawyer's house, and we know without being told that every room is panelled, and that there is a delicious garden at the back of it with fine old trees, and an octagonal white painted summer house somewhere at the end of a long path, and roses, and lilacs, and a hundred other sweet smelling flowers and shrubs.

I can imagine nothing which can give so keen a sense of pleasure as looking at an old English country house on a summer evening as the sun is setting. Then one can realise best the beauty of colour and proportion. The house and the garden seem the very incarnation of the spirit of home; all sounds are hushed, and peace and quiet reign supreme. How different is the modern "mansion!" Let us take one hap-hazard—there is no lack of examples.

First of all the entrance gate, red-hot with paint and gilding, with stone piers, topped either with lamp-posts or a borrowed crest. This opens into a drive, aptly termed "serpentine," and presently the house comes into view.

We seem to be able to tell at a glance the character of the owner of this house. Wealthy he undoubtedly is, and the house is apparently designed to advertise the fact to the world in general. The enormous conservatory is an outward and visible sign that priceless orchids are grown within, and many tropical plants, whose names and natures are unknown to anyone but the gardener.

The windows blink and stare at the sun, and the great sheets of plate glass look like molten brass.

The drawing-room is furnished *en suite* in blue or crimson, and he is a bold man who would dare to sit uninvited on any of the gorgeous chairs or sofas. See the garden from the windows: curved paths streaming like ribbons in all directions, manufactured undulations, "specimen" trees, and carpet beds, everything baking in the sunlight, and as neat and trim as three gardeners and a boy can make it.

No one can feel that this is home-like. The melancholy thing is that this result is not brought about accidentally; it is all deliberately planned and thought out, and may be taken as expressing exactly the spirit of the age. The owner is proud of it, and so, in a measure, is the neighbourhood.

Even more depressing than this is a walk in the suburbs of London. North, south, east, or west, they are all the same. There are only two styles of suburban houses, the gabled and the ungabled. The gabled is the most popular.

Take any one and examine it a little in detail. The height is generally considerably greater than the width. The windows of which the front mainly consists are of impossible proportions. There are, of course, a stone bay, with wooden sashes; a porch rich with brown graining, going halfway up the house; and bricks the colour of a London fog, with wiry streaks of red running through at intervals. A purple slate roof, with a formidable spiky iron ridge, tops the whole, and the house is complete.

Houses of this kind are stereotyped, and have enclosed London like a forest; thousands of people live in them and call them home, and I suppose they may also be considered as expressing the spirit of the age.

In every age and in every country the spirit of the time is shown in the homes of the people, and I am afraid that when future generations read our history from our houses, they will not see in them anything to increase their admiration for the spirit of the nineteenth century.

The house is so often built with too much regard to economy,—thin walls and floors, and a too close apportionment of space; or, on the other hand, it is loaded with ornament inside and out, and is more a vehicle for the display of the owner's wealth than a home.

It is difficult to say what it is that gives a house its particular character of homeliness; the character is there, but it is impossible to dissect the building and say, it is here or it is there; the home feeling is *everywhere* alike.

Breadth is, perhaps, the most marked feature in a home-like house,—the long, low building seems to fit better into the landscape than the house of many stories. The tower speaks of war and strife; and the nearer we approach to that form of building, the less is the air of homeliness.

To build a home-like house we must have the home feeling strong within us. It is no good to study old houses merely as pieces of architecture, sketching a corner here, or measuring a moulding there, and reproducing them more or less correctly. We must study the soul of the building as well as the body; indeed, it is the more important study of the two. Let us once grasp the spirit of the old homes, and we may express it in any outward form we please.

And now, having settled in our minds the ideal home, let us see how we should proceed to realize it.

We will begin with the obstacles. First the person for whom the house is to be built may be presumed to have no sympathy with our ideal; his wish is solely to provide a covering for himself and family which shall be convenient and economical. He will no doubt say, as so many do, that he is going to live inside his house and not outside; he will also have various ideas as to the disposition of certain rooms, and other matters of detail. As to these last, it is important to note any strongly-marked individuality and, if it is at all possible, to emphasise it and let it appear in the house. We will, then, suppose that you have been able to show him that a home must be more than four walls and a roof, and brought him into full sympathy with yourself.

It is important to do all this, but every one must do it in his own way; no one can lay down rules for the guidance of another.

Then we must see the place where it is proposed to build the house, and if we don't grasp it at once, we must go again and again till we do.

It is generally while we are looking at the site for the house, its prospect and aspect, the slope of the land, the positions of trees, roads, and neighbouring meadows, that a half-formed idea of the kind of house that would fit this spot floats into our minds; it is, of course, very vague and shadowy, but it is sufficient to turn our minds in a certain direction.

Having got a motive, our next step is to work it out, quite roughly at first.

Above all things we should avoid looking on a house as consisting of two parts,—plans and elevations. The outside and inside must be considered absolutely as one, and it should be impossible for us to say that the outside suggested the inside, or the inside the outside. We should now let our rough studies simmer a little, and then go more seriously to work. The actual drawings should be looked upon merely as diagrams, and we must avoid being led into the mistake of supposing that things which look well when well drawn will also look well in solid materials; everything should be thought of as *built* before we draw it, and if we have thoroughly made up our minds that this is what we are going to do, let us then draw it as well as possible. Drawing carefully will make us think carefully.

And now as to the general character of the house.

Home means, as I have said before, rest, quiet, and simplicity. Our house must, therefore, be restful, quiet, and simple. It does not matter how small it is: it can always be treated in a broad and simple manner, and have a quiet dignity of its own. A glance at any country cottage is sufficient to convince us of this.

I don't mean to say that a house must necessarily be bare and simple in every part, but simplicity must be the keynote. Certain parts, both inside and out, can, of course, be elaborately treated; but it must seem natural, and not an isolated, piece of work, and the reason for the elaboration must be apparent. It must, too, be borne in mind (although it sounds paradoxical) that elaboration to be effective must be simple, at any rate, in its main lines.

Another danger to be avoided is the deliberate planning of odd nooks and corners; let them come, if they will, naturally, like they did in old houses, and they will be very charming; but where they are purposely and consciously planned, they *always* destroy the repose of the house, and make one feel that it required an effort to produce them.

I am not saying anything about the convenient arrangement of the house; it goes without saying that a house must be convenient, but mere convenience is not sufficient. We must do much more for our house than that. It is unfortunate, perhaps, that the elaborate way in which we live nowadays demands a more complicated plan, and a greater subdivision of the house into various departments, than formerly.

Absolute privacy, when required, is undoubtedly necessary, and is, in fact, one of the charms of home; but it is a question whether we do not lose a great deal of picturesqueness by so entirely shutting off the working part of the house as we do.

The furnishing of the home should not be left to chance. We must contrive to arrange this as well as the house; the home-like character of rooms can very soon be destroyed.

* A paper by Mr. Ernest Newton, F.R.I.B.A. Read (in the unavoidable absence of the author) at the meeting of the Architectural Association on the 22nd inst., as elsewhere mentioned.

The garden, too, must be planned and schemed; it is as much a part of the *home* as the house itself.

In conclusion, I should like to emphasise a few of the remarks I have made previously, especially those bearing upon the home feeling, Unless we have this very strongly, it seems to me that it is impossible to give a house any life at all. Let us study old houses, not as inanimate buildings of more or less architectural beauty, but as expressing the most valuable and beautiful of human sentiments,—the love of home. Nowadays, when all religions are assailed, and we believe in nothing very strongly, it is almost impossible to make our churches express anything more than a sort of galvanised enthusiasm; we reproduce old forms as symbolical of certain legends, although we are not quite sure whether we believe them or not (I am only speaking generally, of course, as there are still many who believe strongly, and whose buildings express this belief very clearly). Belief in the sacredness of home-life, however, is still left to us, and is itself a religion, pure and easy to believe. It requires no elaborate creeds, its worship is the simplest, its discipline the gentlest, and its rewards are peace and contentment.

Mr. Beresford Pite, in proposing a vote of thanks to Mr. Newton, whose absence they all regretted, said that the only fault the paper had was its brevity, although, perhaps, they missed some of those "wrinkles" which they had been expecting to find in it. Mr. Newton had described very cleverly and very eloquently the charm of an old English house, and he had also depicted the horrors of modern houses. With a view of giving the discussion a practical turn, he (the speaker) would endeavour to refer to some points not touched upon in detail in the paper. As to aspect, the architect should always secure a good aspect for the best rooms of the house, wherever he had choice in the matter. No house could be home-like if the drawing-room faced due east, or if the larder were placed due south. The drawing-room should face south or south-west, and the dining-room should have nearly the same aspect. Wherever it was possible to do so, the windows of the principal rooms should be placed with some regard to any special features of the scenery which were visible from them, and if possible the views from the dining-room and drawing-room windows should not be the same. Where the house was a small one, and where the dining-room and drawing-room would occupy the front, it would be desirable to arrange the approach to the front door so that visitors would not have to pass immediately in front of the windows; but, on the other hand, neither should visitors be dragged in front of the kitchen window. Above all, he would invite those who were designing houses to, as a rule, give up the idea of "ingle-nook." He had never been in a drawing-room with an ingle-nook which had been properly warmed, or could be properly warmed, in winter, except with the aid of a heating coil. Another drawback of the ingle-nook was that it confined the fireplace to one side of the room. As far as appearances went, he thought that a fine Elizabethan chimney-piece, with carving and strap ornament, or a panelled or arcaded chimney-piece, looked quite as well upon the wall of a room as anything that could be put into an ingle-nook. Then, with regard to the windows of the principal rooms, it was desirable to study, not only their appearance from the interior of the room and the external views which they afforded, but also their disposition with regard to the lighting of the opposite wall. If the room were oblong in shape, the wall opposite the windows would be the principal wall available for hanging pictures; but those pictures would not be well seen if the windows were placed immediately opposite to them, and therefore an effort should be made to get the windows towards the ends of the room. Very frequently it might be found possible to design some feature, such as a bow-window, which would take off the awkwardness of an oblong-shaped room. There was no necessity for a dining-room to be always exactly the shape of a dining-table, only a little larger; nor was it necessary that a drawing-room should always be of the regulation type. A drawing-room that was L-shaped on plan would often be found very pleasing and comfortable. In small houses there might more often be a reversion to the adoption of means for throwing the dining-room and drawing-room into one for a dance or any other special occasion; but the old-fashioned, awkward, and cumbrous folding-doors should not be used. The doors should either be made to slide within recesses in the thickness of the wall, or at the back of battening or panelling. Another part of the house which might be made a more important feature than was usually the case was the hall, which, however, except in a very large house, should never be loftier than the dining-room. It should be treated as a room, in fact, out of which all the principal rooms should open. By making a feature of the hall, that miserable device, the narrow passage, could be dispensed with. He would advise them not to lay the floor of the hall with tiles; a wooden floor with a good Turkey carpet would be far better. The stairs should not project into the hall, but should start from a concealed recess, or from behind a screen. On the stairs, let them avoid cross-winders it was far better to use good quarter-space landings, and there should be a general feeling of homeliness about the hall and the staircase. In planning a bedroom they should always place the bed. Moreover, they should provide for the hanging of the door so that it might be opened without enabling any one passing up the stairs to see fully into the room. Another thing which should be taken into account in planning a bedroom was the provision of adequate space for the chest of drawers. With regard to the bedroom windows, they should not as a rule be lower than 3 ft. above the floor level, although, in rooms on the ground floor, the windows should come down to within 2 ft. of the floor level. He would advise them not to build external chimneys for the sake of either Queen Elizabeth or Queen Anne. When well done, they were very picturesque, but they were very expensive in coin and coal. Moreover, there were very few men, except Mr. Norman Shaw, who could succeed in making them look well when built. In planning a forecourt, with a carriage-drive, it was necessary to have a width of not less than 50 ft. in order to enable a carriage and pair to turn.

Mr. Bernard Dicksee, in seconding the vote of thanks, said the paper had been an exceedingly interesting one, and it had been supplemented in a very able manner by Mr. Pite. He (the speaker), however, did not quite agree with all that Mr. Pite had said, particularly as to the location of fireplaces. In rooms up to about 18 ft. square, he thought the fireplace might be very effectively placed across the corner. As to dining-rooms, every dining-room ought to be at least 15 ft. wide. In relation to semi-detached houses, there was one point to which sufficient importance was not given. In about every pair of semi-detached houses, one saw the sitting-rooms of the two houses only divided by a party wall,—too often a very thin wall. The consequence was that the noise of a piano being played in one of the houses could be distinctly heard in the next house. That evil might be avoided in semi-detached houses by placing the entrance-hall or passage, the staircase, and the kitchen, against the party wall, and by putting the sitting-rooms against the outer walls. One very essential requisite in a dwelling-house was rarely to be met with: he meant a handy hat and coat-room near the door. It need not be more than 6 ft. or 8 ft. square, and might be usefully combined with a lavatory.

The Chairman, in putting the vote of thanks, said that although Mr. Newton's paper was short, it was very suggestive. Mr. Newton was, of course, somewhat severe on the modern villa type of house, but he (the Chairman) thought they might hope for improvement, of which signs were not altogether wanting. He agreed with what was said as to the futility of striving after picturesqueness; such efforts generally came to grief. There was too often apparent a sense of fussiness and over-elaboration in modern houses. What was really wanted in a home-like house was reticence. Within certain limits of reservation, the fewer the features put into a design the better. Occasionally an ingle-nook or bow-window would come of itself,—it would arise naturally out of the plan; then it was all very well. But after all the care of the architect had been exerted, the effect of his work might be spoilt by the furniture put into the rooms by the client. For that reason the architect should endeavour to retain the ear of his client in the matter of furnishing.

The vote of thanks was then put, and carried with loud applause.

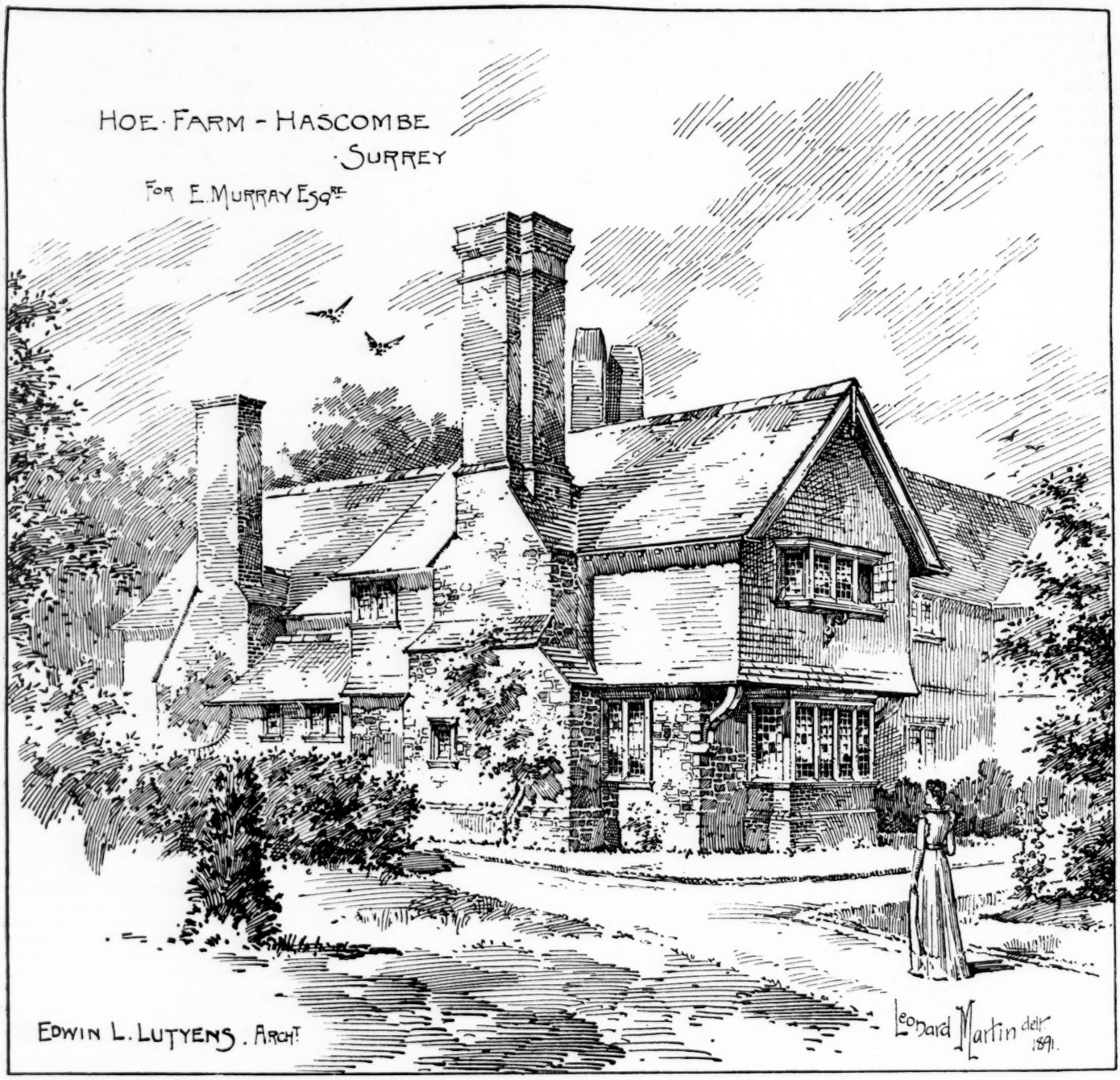
Having passed votes of thanks to the President and other officers, as recorded in another column, the meeting terminated.

Old Houses at Vauxhall.

OLD HOUSES AT VAUXHALL.

SOME picturesque old wooden houses at Vauxhall are being swept away in the course of improvements being carried out in that neighbourhood. The old wooden dwellings just demolished reminded one of the wooden "houses" of Essex, and certainly seemed out of character with a place which now boasts a large new railway station. But a few years ago Vauxhall had plenty of such "shanties" as those depicted here. The Thames Embankment and Doulton's factory swept many away, and many more have gone for the South-Western Railway extension. Few will regret the demolition of these old dwellings. Thomas Miller, "the basket-maker poet," long ago condemned them when, during the terrible cholera year, they were perfect plague-spots.

NEW DESIGNS FOR THE COINAGE.—In the House of Commons on Monday evening, the Chancellor of the Exchequer, replying to Mr. Causton, said the Departmental Committee on the new designs for the coinage would not present any report at present. It was proposed by the Committee that eight artists should be invited to send in designs for the sovereign, half-sovereign, crown, half-crown, florin, and shilling. The proposal was approved, and invitations had been issued to a certain number of artists on March 17. All designs were to be delivered to the Deputy Master of the Mint on or before October 31 next. In reply to a further question by Mr. Causton, the Chancellor of the Exchequer said the Committee, he understood, would recommend the withdrawal of the double florin.



HOE FARM, HASCOMBE, SURREY.

WE give this as an example of a simple but picturesque small country house, by an architect, (Mr. E. L. Lutyens) two of whose designs for a similar class of building are now exhibited at the Royal Academy.

COMPETITIONS.

PUBLIC BATHS AND LIBRARY, DEWSBURY.—The *Leeds Mercury* says that on the 25th inst. the Dewsbury Town Council, sitting at the Town Hall as the General Purposes Committee, opened the envelope marked No. 13, belonging to one of the competitive plans for the above building, and it was found to be from Mr. G. E. T. Lawrence, architect, of Queen Victoria-street, London. Various alterations, both in baths and library, were suggested, and a deputation was appointed to wait upon Mr. Lawrence. Two other plans had been thrown out of the competition, and a fourth was brought in and marked No. 2. This was found to be from Mr. John Lane Fox, of Dewsbury.

BRITISH INSTITUTION SCHOLARSHIPS, 1891.—We may remind competitors for these that all works in competition must be delivered at the entrance to the Western Galleries of the Science and Art Departments at the north end of Queen's Gate, South Kensington, on Wednesday, July 15, or Thursday, July 16, between the hours of 10 a.m. and 6 p.m. All requisite information can be obtained on application by letter (with stamped and directed envelope enclosed) addressed to the Trustees, British Institution Scholarship Fund, 19, York-buildings, Adelphi, W.C.

Illustrations.

THE NATIVITY: CENTRE OF A TRIPTYCH.

THIS is a reproduction from a pencil drawing at present hung in the Royal Academy, illustrating a painting executed by Mr. N. H. J. Westlake as the centre of a triptych at the church of St. Paul's, Wilton-place. It represents the adoration of the shepherds, with a choir of angels above.

CHURCH OF SS. PETER AND PAUL, CHARLTON, DOVER.

THE present church of SS. Peter and Paul, Charlton, is a mean little edifice, with three galleries, and was enlarged in 1827 in the style of that period. It was at this church that Dr. Pusey formed a spiritual refuge when under suspension at Oxford. The proposed new church is of the style of the early part of the thirteenth century, and will be seen to be lofty and impressive, while plain and simple in its treatment. The architect is Mr. James Brooks, Canterbury Diocesan Architect. The church will consist of nave, aisles, north and south transepts, chancel, north and south chapels; the latter chapel will have a second altar. A vestry is placed in the north-eastern angle of the site, and at the north-western angle a tower will be erected, having the appearance of being partly detached. The lower stage of this serves as an entrance-porch, and it is in contemplation to hang a peal of bells in the upper part. A flêche to receive the sanctus bell will be constructed at the intersection of roofs. The exterior of the building will be faced with Kentish Rag, and have Ancaster stone dressings. The entire internal surface of the walls is to have a facing of Bath stone. The roofs will be covered with green slates, having on the inside barrel-shaped ceilings throughout formed of boarding, and with ribs on the underside to divide the space into panels.

The perspective drawing is at present hung in the Royal Academy Exhibition. We give also a sheet of geometrical drawings of the building which Mr. Brooks has been good enough to furnish.

PULPIT, ENGLISH CHURCH, ROME.

THE pulpit here illustrated is designed by Mr. Arthur E. Street for the English Church at Rome. The main structure is of Siena marble, with Perugia marble for the handrail, strings, and shafts, and verd-antique for the panels.

The drawing of the pulpit is in the Royal Academy exhibition.

FONT, ST. MICHAEL'S, SMETHWICK.

THIS simple but original design for a font has been made by Mr. Arthur E. Street for the church of St. Michael at Smethwick, an outskirt of Birmingham. The font is of yellow Mansfield stone, with blue Warwick stone for the steps. The font-cover is of deal stained green and picked out with red, yellow, and white. The little terminals are of brass.

The drawing is hung in the Architectural-room at the Royal Academy, where there is also a drawing of the church (of which Mr. Street is the architect) for which the font was designed

THE ARCHITECTURAL ASSOCIATION.

THE last meeting of this Association for Session 1890-91 was held on Friday, the 22nd inst., in the Meeting-room of the Institute of Architects, 9, Conduit-street, Mr. Leonard Stokes, President, in the chair.

Mr. H. G. Potter was elected a member of the Association, and three nominations for membership were read.

Mr. E. S. Gale, Hon. Secretary, said he had much pleasure in proposing cordial votes of thanks to Mr. Alfred Waterhouse, R.A., and to Mr. T. E. Collcutt, for kindly permitting visits to the new Weigh-house Chapel and the Imperial Institute respectively.

Donations.

The President said he was sure that the members would be extremely delighted to hear that the Association's list of donations in aid of the extension of their educational work had been headed by Mr. Alfred Waterhouse, who had presented them with the sum of 100 guineas. Mr. Aston Webb had also promised them fifty guineas. It would be remembered, also, that Mr. H. L. Florence had promised them 100 guineas conditionally, and that Mr. Seth Smith had promised them 50*l.* a year for three years. Mr. Edmund Woodthorpe had also recently given them a very large number of volumes of the *Builder* and other journals.

These announcements were received with loud and long-continued applause, and a vote of thanks to the donors was carried by acclamation.

A New Monogram.

The President said that on the cover of their Brown-book, on invitation-cards, and on some of their stationery, they had been in the habit of printing for many years past a little badge or monogram, consisting of the letters "A. A." surrounded by the motto of the Association, "Design with Beauty, Build in Truth." On his own account he had ventured to commission Mr. Walter Crane to design a new monogram for them, which he was happy to offer for their acceptance, unless they had any reluctance to the abandonment of the old design.

Proofs of the new monogram (of which we here append an illustration) having been sent

round for inspection by the members, it was resolved, on the motion of Mr. Beresford Pite, to accept the President's generous gift with hearty thanks.

Election of Officers and Committee.

Mr. F. R. Farrow, the senior hon. sec., then read the report of the scrutineers of the balloting papers for the election of officers for next session (1891-92). The report stated that 266 papers had been sent in, of which eight were informal. The following were elected:—

President: Mr. F. T. Baggallay, F.R.I.B.A.

Vice-Presidents: Messrs. F. R. Farrow, F.R.I.B.A., and E. W. Mountford, F.R.I.B.A.

Committee: Messrs. Leonard Stokes, F.R.I.B.A., T. E. Pryce, A.R.I.B.A., H. O. Cresswell, A.R.I.B.A., W. Burrell, O. Fleming, A.R.I.B.A., A. Beresford Pite, F.R.I.B.A., Paul Waterhouse, A.R.I.B.A., A. W. Earle, C. H. Brodie, A.R.I.B.A., and E. Woodthorpe, A.R.I.B.A.

Treasurer: Mr. H. W. Pratt, F.R.I.B.A.

Librarian: Mr. J. W. Stonhold, A.R.I.B.A.

Assistant Librarian: Mr. C. H. Freeman.

Hon. Secs.: Messrs. E. S. Gale and F. T. W. Goldsmith, A.R.I.B.A.

Hon. Auditors: Messrs. W. C. Jones and E. C. Pinks.

Mr. Earle asked whether the secretaries could not announce the numbers of votes recorded for each candidate for the Committee?

The Chairman said he thought it was preferable not to announce the numbers. The names had been read in the order in which they stood on the scrutineers' report.

Mr. F. T. Baggallay, in moving a vote of thanks to the scrutineers (Messrs. Webb, R. G. Booth, Gamble, and Parkes), said he wished to take the opportunity of tendering his hearty thanks, personally and on behalf of his colleagues, for his and their election. All he could say was that they would endeavour to deserve the confidence which had been reposed in them.

The A. A. Travelling Studentship.

Mr. Farrow announced the receipt of a report from the Prizes Sub-committee, in accordance with which they recommended the award of the A. A. Travelling Studentship this year to Mr. Kotaro Sakurai. (This announcement was received with loud applause. The recipient is a native of Japan, and has been for some years a member of the Association).

Votes of thanks were accorded to the members of the A. A. Lyric Club, and other gentlemen who helped to make the recent *soirée* of the Association a success.

Mr. F. R. Farrow, in the unavoidable absence of the author, read a paper by Mr. Ernest Newton on "Home-like Houses," which, together with some notes of the discussion which followed, will be found on another page.

Votes of Thanks to Retiring Officers.

Mr. Beresford Pite said that before the Chairman announced the adjournment of the meeting he wished to propose a hearty vote of thanks to him for the able manner in which he had discharged the duties of President for the past two sessions. It was largely owing to the tact and good temper of their President during the discussion of the scheme for the reconstitution of the Association that they found themselves in their present happy circumstances. He had had a somewhat troublesome crew to manage, but he had succeeded in safely piloting the ship between Scylla and Charybdis. Another point on which he though they must congratulate themselves was that in having Mr. Stokes as their President they had had at their head a practising architect whose talents and abilities were known and appreciated by the whole profession. The Presidentship of that Association was an honour to be coveted, and while they must all feel that that honour had been properly bestowed upon Mr. Stokes in the first instance, they none of them regretted that his term of office had been extended.

The motion was received with loud and long-continued applause, and carried by acclamation.

Mr. Stokes, in the course of a brief reply, said that it had been a great pleasure to him to do what he could for the Association, and he trusted that his interest in it would not cease with his retirement from the chair. It was true that the duties of the office had involved a good deal of trouble, but by way of compensation he had experienced the pleasure of feeling that his efforts on their behalf had been appreciated. Although he was glad that his two years of office were behind him, he should always look back upon them as two of the happiest years of his life.

Mr. A. W. Earle next proposed a vote of thanks to Mr. F. R. Farrow, the retiring honorary secretary.

The Chairman said he should like to second that. Mr. Farrow had held office for the past four years, and it was very difficult for those who were not members of the Committee to realise what that meant. Mr. Farrow had been constantly at the beck and call of the Association, and had been unwearied in his efforts for its prosperity and the extension of its usefulness. In short, he had carried out the duties of his office in a manner which was beyond all praise.

The motion was carried with loud applause.

Mr. Farrow briefly expressed his acknowledgments.

On the motion of Mr. T. E. Pryce, a hearty vote of thanks was accorded to the Treasurer, Mr. Hampden W. Pratt; and, on the motion of Mr. W. J. H. Leverton, a similar expression of thanks was accorded to the Librarian, Mr. W. H. Town.

The meeting then terminated.

CIVIL LIST PENSIONS.—The Civil List pension list closes on June 30. Among the latest additions to the list is Mrs. Redfern, the widow of a sculptor well-known to many of our older readers, James F. Redfern. He died at Hampstead in 1876, and his widow now receives a pension of 100*l.* per annum.

THE SURVEYORS' INSTITUTION:

ANNUAL REPORT.

THE twenty-third annual report of the Council of this Institution, submitted to the annual general meeting on Monday evening last, contained the following passages:—

"The Council have the pleasure of submitting to the members the usual report on the state and progress of the Institution during the twelvemonth which closes to-day. Judged by any standard, the year has been marked by abundant evidences of prosperity. The increase in numbers, as will be seen by the subjoined table, has been greater than in any previous year, a fact due, to some extent, to the approaching change in the system of admission; but also, in a considerable degree, to the growing influence of the Institution, and the repute it enjoys as a Professional Society devoted to practical objects.

Increase of Membership.

	Honorary Members.	Fellows.	Professional Associates.	Associates.	Students.	Total
May 1891	14	1,360	336	96	140	1,946
May 1890	15	1,080	310	89	123	1,617
	-1	+280	+26	+7	+17	+329

The increase of 280 in the number of Fellows is accounted for by 259 elections and forty-three transfers from the class of Professional Associates, less seventeen deaths and five cessers of Membership.

The relatively small increase in the number of Professional Associates is due to the fact that during the year forty-three members were transferred to the class of Fellows, while two died and fourteen ceased to be members.

The number of Associates remains, as a rule, much the same from year to year; the increase of seven, notwithstanding two deaths and two cessers of membership, is larger than in any recent twelve months.

The net addition to the number of Students has been seventeen.

It will be observed that there has been a large increase in the number of country Members during the year.

The effect has been a satisfactory expansion of the Membership in several parts of England at a distance from the Metropolis in which the Institution has hitherto been rather scantily represented.

The loss of members by death has unhappily been greater than in some previous years. By the decease of the Duke of Bedford the Institution has lost an Honorary Member who was a most munificent donor to the Library.

The annual growth of the Membership from the foundation of the Institution is shown in the following table:—

Yearly Growth of Membership.

Year.	Members (or 'Fellows' after 1881.	Associates.		Students.	Total.
		Professional.	Ordinary.		
May, 1869	162	38		2	202
,, 1870	180	59		2	241
,, 1871	192	65		2	259
,, 1872	205	67		4	276
,, 1873	225	74		5	304
,, 1874	247	89		6	332
,, 1875	275	101		11	387
,, 1876	300	119		8	427
,, 1877	310	133		11	454
,, 1878	312	134		8	454
,, 1879	330	146		10	486
,, 1880	342	155		10	507
,, *1881	357	164		14	535
,, 1882	480	235		7	722
,, 1883	557	218	74	38	887
,, †1884	666	307	80	58	1,121
,, 1885	703	317	86	86	1,192
,, 1886	716	316	84	80	1,196
,, 1887	741	339	89	108	1,277
,, 1888	798	333	90	102	1,323
,, 1889	910	334	89	110	1,443
,, 1890	1,095	310	89	123	1,617
,, 1891	1,374	336	96	140	1,946

* After August, 1881, 'Members' were designated 'Fellows,' and, in 1883, 'Associates' were divided into 'Professional Associates,' and 'Non-Professional Associates.'

† The Compulsory Examination for Professional Associates came into operation in 1884.

Examinations.

The number of Candidates for the Preliminary Examinations, as will be seen from the

subjoined table, shows a large increase over the number of any previous year:—

Years.	Preliminary Examinations.			Professional Examinations.		
	Candidates.	Passed.	Percentage.	Candidates.	Passed.	Percentage.
1881	13	6	46·15	2	1	50·00
1882	30	17	56·66	—	—	—
1883	44	22	50·00	25	22	88·00
1884	51	30	58·82	36	23	63·89
1885	46	37	80·43	43	31	72·09
1886	46	34	78·26	56	38	67·85
1887	53	39	73·58	58	45	77·59
1888	48	39	81·25	73	52	71·23
1889	51	41	80·39	71	51	71·83
1890	53	44	83·01	96	70	72·91
1891	76	60	78·94	92	68	73·91
Totals ..	511	369	72·21	553	401	72·51

Of the total number (ninety-two) of Candidates for the Professional Examinations, fifty-five were from the Provinces, thirty-seven from London. . . .

The first of the Special-Certificate examinations in Forestry and in Sanitary Science were held on June 17, 18, and 19, 1890. Six Candidates presented themselves in the subject of Forestry, of whom two passed, and five in Sanitary Science, of whom only one satisfied the Examiners. It was not expected that any large number of Candidates would at first submit themselves to an ordeal which is more a test of practical experience than of theoretical knowledge, and several years will elapse before much progress as regards these Examinations can be looked for. The Council do not, therefore, propose to hold another Special-Certificate Examination until 1892, if a sufficient number of Candidates have then accumulated to justify them in putting the rather expensive machinery again in motion. . . .

It only remains to remind the Members that in the course of less than three months from the present date the Institution enters upon a new epoch of its existence.

During the few weeks that remain it is hoped that any qualified Surveyors (especially the partners of present Members) will avail themselves of this last opportunity of joining the Institution under the expiring practice qualification.

The Council also appeal to Members to urge upon their pupils and professional assistants the importance of qualifying by examination for Membership, thus laying a broad and strong foundation for the development of the Institution in future years."

The report was adopted.

The annual dinner of the Institution was held on Monday evening at the Holborn Restaurant, the President, Mr. Robert Collier Driver, taking the chair. The company included Lord Basing, Sir Robert Rawlinson, K.C.B., Mr. P. E. Cunliffe (President of the Incorporated Law Society), Sir Henry E. Cartwright, Mr. E. Leader Williams, C.E., Colonel Bristow, Mr. E. Ryde (past President), Mr. E. P. Squarey (past President), Mr. D. Watney (past President), Mr. T. Chatfeild Clarke (vice-President), Mr. J. Martin, Mr. R. Vigers, Mr. J. Shaw, Mr. A. Back, Mr. E. Smyth, Mr. Wheeler, Q.C., Lieutenant-Colonel G. A. Leach, R.E., Mr. A. M. Dunlop, Mr. T. M. Rickman, Mr. A. Vernon, Mr. H. T. Steward, Mr. G. M. Freeman, Mr. H. T. Ashby (President of the Institute of Builders), Mr. S. Chadwick, Mr. Humphreys (Leicester), Professor H. Robinson, Mr. Wright (Nottingham), Mr. C. N. Driver, Mr. W. B. Stenning, Mr. H. H. Collins, Mr. W. Woodward, and Mr. J. W. Penfold (hon. secretary).

IMPROVEMENTS TO ESPLANADE, BRIGHTON.—Mr. Thomas Codrington, M.I.C.E., Local Government Board Inspector, held an inquiry at the Brighton Town-hall, on the 21st inst., in reference to an application by the Town Council for sanction to borrow 5,000*l.* for improving the Western Esplanade. The Town Clerk explained that it was proposed to face the Gaps at Middle-street and Ship-street with red brick so as to make them in keeping with the rest of the structure, and at the former Gap to build three new arches, to widen the Esplanade opposite the Grand Hotel, construct ten new arches, reconstruct the urinal, and make new steps to the beach, and further to raise the Esplanade on the seaside westward of the West Pier so as to make the surface more level, and to construct a number of new arches there. There was no opposition to the scheme.

THE INSTITUTION OF CIVIL ENGINEERS:

ANNUAL MEETING.

THE annual general meeting of corporate members "to receive and deliberate upon the report of the Council on the state of the Institution, with the annual statement of the accounts, and to elect the Council and officers for the ensuing year," took place on Tuesday last, Sir John Coode, K.C.M.G., the President, being in the chair.

In the Report of the Council for the Session 1890-91, it was remarked that the salient feature of the Session, now terminated, had been the realisation of a proposal made more than forty years ago, namely: the formal reception by the President and Council on stated evenings after the ordinary meetings of the members and visitors then present. This was proposed, in 1850, by Sir William Cubitt, but for various reasons the suggestion was not acted upon, although in a modified form it was met by the *Conversazione* given by the President. In progress of time the gradually increasing numbers forming the Institution rendered the continuance of this social gathering impracticable. Sir William Cubitt's idea was — first, the provision, at intervals during the Session, of an opportunity for the personal introduction to the President and Council of those members who might not otherwise make their acquaintance; and, secondly, the collection in the rooms of the Institution of a limited number of models and specimens. A series of receptions was held after the ordinary meetings in the months of January, February, March, April, and May of this year. An endeavour had also been made to identify, in some degree, each gathering with a particular branch of engineering, both in respect to those invited to be present and to the models and other objects of interest exhibited. These receptions were believed to have been most successful, and experience would doubtless suggest directions in which they might be rendered still more useful and attractive in the future.

Passing to the usual business of the session, it was noted that twenty-three ordinary meetings were held at which eleven papers had been read and discussed. For some of these papers Telford Medals and Telford Premiums had been awarded to Messrs. Ll. B. and C. W. Atkinson, and to Mr. R. E. B. Crompton, and Telford Premiums to Messrs. F. E. Robertson, E. W. Stoney, Professor John Milne and Mr. J. McDonald, Mr. W. Langdon and Mr. W. T. H. Carrington. For other papers, printed or to be printed in the Proceedings without being discussed, Telford Premiums had been awarded to Messrs. B. Donkin, Jun., J. J. Webster, and C. P. Sheibner. There were eight Supplemental Meetings for Students, at which, unfortunately, the attendances had been small. For papers read at these meetings Miller Prizes had been awarded to Messrs. E. L. Hill, J. H. Barker, W. A. P. Tait, B. Chatterton, J. W. Brown, A. Sealy-Allin, and W. H. Wheeler. The first three of these papers had been deemed worthy of publication, and would appear, either in whole or in part, in the Minutes of Proceedings. The works visited by the students were referred to as having been greatly appreciated by those who had availed themselves of the privileges offered, and the Council recorded its sense of indebtedness to the heads of the several establishments.

The effective increase in the roll of the Institution during the past year was 247. There had been elected 2 Honorary Members, 51 Members, 291 Associate Members, and 7 Associates, and 3 Associate Members had been restored to the Register. Only 107 names had disappeared from the list. The number of members of all classes, students excepted, on March 31 last was 5,150, as against 4,903 on the same day last year, representing an increase at the rate of 5 per cent. The Student class had somewhat diminished in numbers, the total being, on March 31 last, at 914, as against 969 on March 31, 1890. This was not due to any diminution in the numbers admitted, but to the fact that more students had been elected Associate Members during the year, and that a greater number had become ineligible to remain in the class by reason of having passed the limit of age, namely, twenty-six years. Adding the students to the number on the register, the gross total on the books was 6,064.

From the balance-sheet appended to the report it appeared that the receipts during the financial year amounted to 24,274*l.* 8s. 11d., and the payments to 23,351*l.* 1s. 9d. The capital invested during the year represented the purchase of Railway Debenture Stocks of the nominal (or par) value of 6,500*l.*, thus bringing up the Institution investments to 50,000*l.*, besides which the Corporation was possessed of freeholds which had cost 40,000*l.*, the Whitworth Legacy of 5,400*l.*, and Trust Fund Investments aggregating 15,286*l.*

The Council congratulated the members that, as the result of protracted litigation with the Inland Revenue Department, the House of Lords had upheld the judgment of the Court of Appeal, that the whole of the property of the Institution was exempt from Corporation duty under the Customs and Inland Revenue Act of 1885, on the ground that it was legally appropriated and applied for the promotion of education and science.

In conclusion, reference was made to the action of a committee of members outside the Council, which had resulted in the establishment of an endowment fund for the purpose of perpetuating the memory of the long services of the secretary in the interests of the Institution. It had been decided that the endowment in question, with any future additions, should be applied to the establishment of a "James Forrest Lectureship," it being left with the governing body for the time being to determine the subjects, the periods of recurrence, and all other details connected with such Lectureship.

The adoption of the report was moved, seconded, and carried, and it was ordered to be printed in the Minutes of Proceedings. Cordial votes of thanks were then passed to the President, to the Vice-Presidents, and other members of the Council, to the auditors, to the secretaries and staff, and to the scrutineers.

The ballot for Council resulted in the election of Mr. George Berkley as President; of Mr. H. Hayter, Mr. A. Giles, M.P., Sir Robert Rawlinson, K.C.B., and Sir Benjamin Baker, K.C.M.G., as Vice-Presidents; and of Mr. W. Anderson, D.C.L., Mr. J. Wolfe Barry, Mr. E. A. Cowper, Sir Jas. N. Douglass, F.R.S., Sir Douglas Fox, Mr. J. Clarke Hawkshaw, M.A., Mr. Charles Hawksley, Sir Bradford Leslie, K.C.I.E., Mr. George Fosbery Lyster, Mr. J. Mansergh, Sir Guilford Molesworth, K.C.I.E., Mr. W. H. Preece, F.R.S., Sir E. J. Reed, K.C.B., F.R.S., M.P., Mr. W. Shelford, and Mr. F. W. Webb as other members of the Council.

The session was then adjourned until the second Tuesday in November, at 8 p.m.

BRITISH ARCHÆOLOGICAL ASSOCIATION

AT the meeting of this Association on the 20th inst., Mr. J. W. Grover, F.S.A., in the chair, it was announced that the Marquis of Ripon had accepted office as President of the Association at the Annual Congress, which will be held at York, to begin on August 17 next. Visits will be paid to Rieuvaulx and Bylands Abbey, various ancient castles, and, by invitation of the President, to the ruins of Fountains Abbey. Mr. Allis sent communications with respect to the remarkable Roman remains which have recently been found at Lincoln. A long colonnade of large Roman pillars has existed in the centre of ancient Lindum. The bases of these pillars have been found *in situ*, ranged in a straight line with those which exist beneath Mr. Allis's house, discovered and preserved by him a few years ago, and where the angle of the colonnade is marked by double columns curiously joined together. Three other examples of these double bases have now been found, showing a break in the continuity of the plan, and at this place a Roman milestone, probably marking the centre of the ancient city, was found some years since. The entire length of the colonnade is about 280 ft. Mr. Marriage exhibited several fine examples of Venetian glass, and Mr. Macmichael described some interesting examples of Roman pottery found in the city. A paper by Mr. A. G. Langdon on the Padstow crosses, Cornwall, was then read. These crosses are three in number, one being in the churchyard, another at Prideaux-place, and a third, a cross head only, in the garden of a cottage occupying the site of the old vicarage. The latter is of Elvan stone, and the two first of granite. They are curious for having cusps in the heads of two of the examples, while other portions are covered with early patterns of plait work.

IRON AND HARDWARE TRADES' PENSION SOCIETY.

THE forty-eighth anniversary festival of this charity was held at the Ironmongers' Hall on Tuesday evening last, Mr. Howard J. Kennard in the chair, and the Master Cutler of Sheffield, Mr. Robert Colver, in the vice-chair. The charity pays out to pensioners something like 3,000*l.* a year, and has now about 130 recipients of its bounty. Mr. Kennard has signalised his year of office by unusual exertions towards raising the income of the society, and he has so far succeeded that there has never been a year in the experience of the society when so much has been collected—the sum of 4,269*l.* 11s. 3d. was announced by the secretary as subscriptions and donations.

Mr. Kennard said he aspired to the institution being made a royal society, but before that could occur he must be able to show a larger annual revenue. In two years' time the society would attain its jubilee, and he hoped to have the Prince of Wales in the chair on that occasion.

Mr. Windson Richards devoted much of his speech to a vindication and advocacy of trade combinations. As the workmen were quick to combine to strike up their wages on a rise in iron prices, so he maintained that employers might legitimately combine so as to abolish the ruinous, foolish, and reckless competition that prevailed among them. In this case he was sure that the interests of the general trade of the country would not suffer.

Since the foundation of the society there have been received 75,586*l.* in subscriptions, and 27,655*l.* in donations; of which sum 90,933*l.* have been paid as pensions. The entire expense of working the concern is stated to be under 7½ per cent., or for the forty-nine years of its existence, 18,676*l.*

THE MINING INDUSTRIES OF THE WORLD.

THE *Economiste Francais* in a recent issue contains an interesting article on the mining industries of the world, of which we give a *résumé*. Dealing first with the coal industry, we learn that the world's production of coal in 1888 reached the enormous total of 466,406,000 tons, valued at 136,500,000*l.* The greatest output is shown by this country, which in 1888 produced 169,935,000 tons, and the smallest by Russia, viz., 4,580,000 tons. Austria-Hungary comes fourth with 23,647,000 tons, and France only fifth with 22,603,000 tons. Great Britain finds employment for the largest number of colliery hands, viz., 535,000, and Russia for the smallest, 33,000, and although Austria produces a million tons of coal more than France the number of hands employed in the industry is much smaller in the former country, viz., 97,000 to 105,000. The cost of raising and dressing the material is dearest in France, viz., 10·31 francs per ton, and cheapest in Austria, viz., 5·23 francs. As regards other mining industries, iron, gold, silver, &c., the subjoined table gives the production of the world in 1888:—

	Ore. Tons.		Value. Francs.
Iron	23,512,000	...	1,624,374,000
Gold (166,225 kilos)	—	...	549,500,500
Silver (3,720,951 kilos)	—	...	764,800,000
Copper	341,000	...	541,664,000
Lead	517,000	...	199,859,000
Zinc	344,000	...	151,644,000
Tin	35,000	...	98,626,000
Quicksilver	4,000	...	22,103,000
Nickel, cobalt, and platinum	3,000	...	15,176,000
Total	24,760,000	...	3,967,746,000

The following was the output and value of other produce obtained by mining:—

	Tons.		Francs.
Coal	466,406,000	...	3,412,000,000
Petroleum	5,712,000	...	204,643,000
Bituminous fuel and asphalte	2,499,000	...	20,430,000
Rock salt	8,347,000	...	125,356,000
Manganese, pyrites of sulphur, sulphur, and graphite	1,215,000	...	50,022,000
Total	508,939,000	...	7,780,197,000

To which may be added:—

	Francs.
Precious stones	300,000,000
Clay, &c.	800,000,000
Total	8,880,197,000

Turning to the production and consumption of coal in France, the former amounted in 1779 to 250,000 tons, and the latter to the same, whereas 100 years later the figures were respectively 22,603,000 and 32,600,000 tons. To make good the deficit 5,100,000 tons had to be imported from Belgium, 4,100,000 tons from England, and 1,300,000 tons from Germany. Referring to the profit attending various mining enterprises, we are told that in France, in 1888, 226 of these paid, whilst 201 left a loss. Finally accidents in mines are dealt with, the figures furnished tending to show that through the measures of safety in mines, which are becoming more and more developed, their number is steadily decreasing. In proof of this assertion, English mines are taken, where, in the period 1851–60, the average number of accidents was 507 a year; in 1871-80, 233; and in 1881-8 only 199.

Books.

Encyclopédie de l'Architecture et de Construction. Directeur P. PLANAT. Vol. V.: Premier Fascicule. Paris: Dujardin & Cie.

M. PLANAT'S dictionary, which has now reached the letter L, includes in the new volume several important articles. A long and largely illustrated essay on "Gothique Anglaise" is contributed by the editor, and is written with a knowledge of and sympathy with English Gothic architecture unfortunately rare among French writers. He remarks in the early part of the article on the gradual manner of the extinction of Gothic in England, its gradual absorption into the new style, and that English architecture never shows those violent reactions against the past which have often been observed in the writer's own country; "les traditions s'y alterent, se modifient, il le faut bien; elles se brisent rarement." This would hardly apply, perhaps, to England in the nineteenth century, however true it may be about former times. The object of the article is to mark the principal epochs of English Gothic by examples characteristic of each period. As a *point de depart* M. Planat takes the front of Castle Rising Church, of which he observes that "toute simple qu'elle soit, celle façade donne ailleurs, comme tous les bons exemples de l'époque, l'impression d'une harmonie robust, tranquille, exempt de toute exaggeration, que les plus beaux specimens de la période Gothique ne produisant pas toujours." Nevertheless, M. Planat is enthusiastic over Canterbury, the eastern portion of course more particularly, which he considers as one of the most typical edifices in England; and he recognises the architecture of the nave of Lincoln as the example of the most sober and correct Gothic. Salisbury, Peterborough, and Westminster are touched upon, not too well illustrated, but perhaps as well as can be expected in regard to the conditions of production of a dictionary. Ely, Exeter, and York also come in for ample notice, and there are some examples of domestic Gothic, from Magdalen College, the Deanery of Wells, and South Wraxall Manor House. The article on "Gothique Allemande" is by Messrs. Lambert and Stahl, an article of the same type, rather better illustrated. "Greek Architecture" is treated by M. Joigny, an article which does not of course profess to treat that vast subject in any complete manner, but is intended, the writer says, as a kind of preface to the study of Greek architecture, a discourse summing up the various aspects under which the subject may be regarded; the origin of this form of architecture, and the special central qualities which distinguish it. In regard to one point, the modulus of proportion of Greek buildings, we observe that M. Joigny declines the long-accepted use of the semi-diameter of the base as the module, and considers that if the diameter of the column were so used it must have been the mean diameter. This is an important suggestion, and one which would upset all the proportion indications of "Normands Parallels" and other respectable old works.

"Île de France" is an article of considerable interest, on that venerable site which is the eye or nucleus of ancient Paris; and the large subject of Italian architecture is treated in a long and amply illustrated article by the competent hand of Professor Alfredo Melani.

M. Lucas continues to treat of English architects in short articles written with great judgment and appreciation, the articles on Inigo Jones and the late Sir Horace Jones being signed by his name. Inigo Jones was so remarkable a man that he might perhaps be held to have merited a larger and fuller notice than the three columns accorded to him, but he is treated at greater length than some very eminent French architects. It is regrettable to find that Gwilt (not in the able hands of M. Lucas) is dismissed with a single line, as an eminent architect who made the best dictionary of architecture. It is a very great pity that M. Planat should be robbed by an incompetent contributor of doing justice to a man who produced such a remarkable work as Gwilt's Encyclopædia, and we surmise that if M. Planat were aware of the full value and scope of that work he would himself regret having been betrayed into leaving its author so entirely without due recognition. Gwilt deserved at least as large a place in such a dictionary as Fergusson: perhaps a larger.

It is a pity that more care cannot be exercised about getting the spelling of English names correct, a matter in which however French publications are almost proverbially deficient. We have come across "Rugdale" (for "Dugdale"), "Walsokin," "Blomefield," "Houden" (for "Howden" church), in the course of turning over the pages, and probably there are more. Considering that all these names must be copied in the first instance from English publications, it might surely be possible to copy them correctly.

Lessons in Applied Mechanics. By JAMES H. COTTERILL, F.R.S., and JOHN HENRY SLADE, R.N. (London: Macmillan & Co.) 1891.

THIS little book is really an abridged edition of Professor Cotterill's larger treatise on applied mechanics. It is, however, of a much more elementary nature, and more suited for junior students who are commencing to study the subject. The authors have divided the book into three parts. In the first part the "Principle of Work" is considered, and in the second and third parts the strength of materials and structures, and the more elementary principles of hydraulics and hydraulic-machines are treated. There is an excellent selection of examples attached to each chapter, and the whole forms a book we can recommend with confidence to those who are beginning an engineering course of study.

Memoir and Letters of Sidney Gilchrist Thomas, Inventor. By R. W. BURNIE. (Murray.)

THIS is a pleasantly-written little work, giving an account of the too-early-cut-off life of the indomitable inventor of the celebrated process for the dephosphorisation of iron, which bears his name. The greater portion of the book, though very interesting and well worth perusal, is of a non-technical character. A few extracts from the account of the process will, however, probably interest our readers.

It was in 1875 that Thomas began to see his way to a solution of the hitherto baffling question, "Why was phosphorus retained in the Bessemer converter?" The answer was found in the fact that, with the acid lining of the ordinary Bessemer converter the phosphoric acid naturally could not combine, there being a complete absence of chemical affinity. The next step naturally was the utilisation of various materials that would form "basic" linings, for which the phosphoric acid would naturally have affinity. The investigation was a tedious one before sufficiently durable compounds were hit upon. Durability was essential to cheapness, and therefore to commercial success, and a substance that would long survive the intense heat of the Bessemer process was by no means easy to find. Thomas finally decided that the required material must be either lime or its congeners—magnesia, magnesian limestone, &c. A twofold object was aimed at, the first being the elimination of the phosphorus, thus enabling marketable steel to be made from hitherto unserviceable qualities of pig-iron; and the second, though subsidiary, was the preservation, in the basic slag, of the phosphoric acid, so valuable to the agriculturist. With the aid of his cousin, Percy Gilchrist, and the subsequent encouragement of Mr. Edward Martin, the manager of the Blaenavon works, and later on (at what was probably the critical moment) of Mr. E. Winsor Richards, the manager of Bolckow, Vaughan & Co's huge works in Cleveland, the process was worked out to a practical issue. It would take up too much space to follow the progress of process to its ultimate triumph; suffice it to say, that before the untimely end of the inventor, he had the satisfaction of seeing the creation of his brain recognised and utilised by nearly every iron-producing nation, and not without profit to himself and those associated with him. The police-court clerk, who a year or two before had been refused election to the Chemical Society, notwithstanding his undoubted scientific attainments, solved a problem that had completely baffled the learned *quid-nuncs* who blackballed him.

The character of the converter lining being the essence of the process, a short extract from

the paper which Mr. Thomas, in collaboration with Mr. Gilchrist, prepared in 1878 for the Autumn Meeting of the Iron and Steel Institute, will be deemed of interest.

"Our early experiments rendered it clear that ordinary non-silicious limes and limestones did not constitute by themselves a satisfactory lining material, nor were renewed trials, made after becoming acquainted with a patent dealing with their application, more satisfactory. Magnesia, the use of which as a furnace lining has been suggested by M. Caron and others, is at once very expensive, and when used by itself, very tender. After a very extended series of trials it was, however, found that by firing bricks made of an alumino-silicious limestone at a very intense white heat a hard and compact basic brick is formed. These bricks unfortunately labour under the defect of a liability to disintegration when exposed to the action of steam. By the use of certain aluminous magnesian limestones and equivalent combinations, and an otherwise similar mode of manufacture, this difficulty has been, after many failures, overcome."

In order to avoid waste of lining, basic materials, such as common well-burnt lime, were added to the contents of the converter, so as to secure a highly basic slag at an early stage of the blow. In 1883, shortly before the close of his useful career, Thomas was awarded by the Iron and Steel Institute the prized distinction of the Bessemer Medal, and in a letter of thanks, written to the President, he observes that while in 1877 "no successful experiment tending to show that phosphorous could be removed in the Bessemer or Siemen's process," was on record, yet "for the present month of September, 1883, the make of dephosphorised Bessemer and Siemen's steel is between 60,000 and 70,000 tons." A marvellous result, especially viewed in the light of the many difficulties that had to be overcome by the young enthusiast, who, after a day's labour in the sordid atmosphere of a London Police-court, devoted the hours that for the ordinary man would be those of recreation, to the solution of a difficult and complex metallurgical problem.

Correspondence.

To the Editor of THE BUILDER.

THE STRIKE IN THE BUILDING TRADE.

SIR,—Building artisans appear to think that the questions of increased cost and shortened hours of work concern only themselves and the master builders. But there is clearly another large party concerned, viz., the general public, who are the paymasters. The present demand would add 11 [or 12 per cent. to the cost of labour all round, and besides this the extra time which would be necessary for carrying out works would increase seriously the expense. Take a common instance—certain alterations and repairs have to be executed on a house which necessitates the premises being vacated, and it is a serious question for the owner of the house in how short a time he can return and re-occupy the premises. Under the short hours proposed, the work would occupy much longer time than at present, unless the unfortunate house owner is prepared to pay an increase of 50 per cent. (time and a-half) for expedition. I maintain, Sir, that 52 hours per week is not an undue strain on an able-bodied working man—in fine weather. In winter there must be many days when he cannot see to work so long, and sometimes, from frost and fogs, must, perforce, be idle altogether.

May 28, 1891. A RETIRED BUILDER.

DISCOVERY OF A MEDIÆVAL PAINTING.

SIR,—During the execution of some additions to the ancient parish church of St. Mary, Puncknoll, on the English Channel, near Abbotsbury, Dorset, an interesting discovery of mural decoration above the Norman chancel arch has been made. Upon removing the accumulated coats of whitewash, traces of a decorative design were brought into view.

On the northern side of the arch the outline of the lower portion of a vesica is apparent. Within it appear to be two figures, one standing at what seems to be the base of a cross, the other suspended upon the cross, and judging from the position of the feet, it probably is a representation of the crucifixion in profile. Outside the vesica are two figures, facing each other, occupying the position of supports to a coat-of-arms.

To the north is a fifth figure turning his back upon this group.

There are traces apparently of circular shields, spearheads, &c. This description refers to the lower part only, as the upper is still more indistinct. The whole is framed by a border of lines enclosing at regular intervals the heraldic rose of five foils. The pigments used appear to be Indian red, yellow, and green, laid upon a very thin skimming of plaster upon the original stonework. Later this design was whitened over and a black letter inscription placed upon the new ground thus obtained. Subsequently successive coats of white and yellow-wash have until now hidden the whole. A similar mode of obliterating an early decoration by placing over it a black letter inscription was noticed a few years ago at Goathurst, in the adjoining county of Somerset. There are also traces of colour over the centre of the arch, and on the south side of it, but these are less distinct than those on the north. The workmen, however, were stopped from attempting to uncover any more, in the hope that an arrangement would be made for dealing with the remains without further injuring them.

J. HOUGHTON SPENCER.

Taunton, May 23, 1891.

AN OLD ESTIMATE FOR LAYING WATER-MAINS.

SIR,—The enclosed is a copy of a letter I have had in my possession for very many years. It has often occurred to me that some of your readers may know more about Mr. Norwood and his business than I do, and something might be elicited thereon. Mr. Thomas Hogg was surveyor to the Grand Junction Canal Company, or surveyed the land for their Act of Parliament, and was also a well-known land-surveyor of the end of the last century, and early in this century. The copy is exact to the spelling, the capitals, and to the lines, the original being written on quarto paper. Perhaps you may deem it worthy of insertion in the *Builder*.

WYATT PAPWORTH.

33, *Bloomsbury-street, W.C.*

May 26, 1890.

[COPY OF LETTER REFERRED TO ABOVE.]

"Sir,—I hope you will Not think Me
Troublesom——
I have Made Calculation of Expence of Conveying Water to the Town you Mentioned by Means of My pipes or Tubes ——

I Give preferance to Making the pipes in the Country —

if you think it Likely to take place Now is the Time to Execute the Business to the Best Advantage.

if Agreeable to you I will Contract to find pipes, and Lay them Down.—Under your Direction, on the following Terms—which will Give you Little Trouble—

	£	s.	
Viz.—pipes of 4 Inch Boar	2	6	Pyd
5 Inch Boar	3	0	Pyd
6 Inch ——	3	6	P.yd

if the Town is at any Terme in want of Water ——Subscribers will Come forward—there is No Doubt—

if agreeable will take an Interest Myself——

there are Several Near London in Hand—there is No Undertakins pay Better the Royal Pallace of Hampten Court is Supplyed with Water—About the Distance you Mention—by pipes of the Kind I propose—Laid Down by—Cardinal Wolsey—are as Good as when Laid Down—proove as Eficatious and far Moore Dureable than Wood——

a 5 Inch Boar pipe with 3 feet pen will Supply a Learge Town——

I am at Presant at Leasure to Attend to the Businiss,—will Call on Monday Eveng—for an Answer

Compliance will Greatly Oblige
Your Most Humble Servt
W. Norwood

Friday Eveng
5 May 1809.

Addressed Mr Hogg"

HORROCKS'S OBSERVATION OF THE TRANSIT OF VENUS.

SIR,—The instrument delineated in the painting is an artist's equatorial telescope of early nineteenth-century fashion. What Horrocks (or Horrox) calls his "mighty tube" consisted of a Galilean telescope which he made, and for which he bought a negative eye-piece for, as he says, 2s. 6d. This cast an inverted image of the sun upon a diagram, which he would have made larger had his room been bigger. The diagram (sketch enclosed) was a circle very nearly 6 in. in diameter, having its circumference divided into 360 deg., and its diameter into thirty equal parts, each such part being subdivided into four equal portions. The sun's disc exactly filled the diagram; he saw Venus within the circumference from 3.15 p.m. until the sun set at 3.50 p.m. Venus appeared as a perfectly circular and uniformly opaque spot between $\frac{1}{4}$ and $\frac{1}{3}$ in. in diameter, travelling her own diameter in about twenty-five minutes. He estimated the sun's diameter to that of Venus as 30′ to more than 1′12″ and less than 1′30″. The room was quite darkened; having previously adjusted his telescope to a focus, he rested one end either upon or close to an aperture in one of the shutters, receiving the sun's rays perpendicularly upon the diagram. We do not know what was the negative focus of the lens, or whether the room was constructed so as to afford a view of the sun throughout the day. The date, Sunday, November 24, 1639, which he gives for the transit is that of the Julian Calendar. Mr. Eyre Crowe's interesting, but in some respects inaccurate, picture forms the subject of an article which will, I believe, be printed in the June number of *Knowledge*. To the exertions of Mr. A. Cowper Ranyard, F.R.A.S., editor of that journal, the tablet (1874) in the Abbey is due. W. E. D.-M.

May 23, 1891.

COLOUR FOR SURFACE OF TENNIS COURT.

SIR,—In reply to your correspondent "J. T." (p. 415 *ante*), *re* above subject, I should paint the surface in fresco, that is before the cement is set, mix the dry colour with encaustic medium, and apply the same. He will find that the colour will penetrate into the cement, and retain its brilliancy.

HENRY H. B. SANG.

GRIMTHORPIAN.

SIR,—The Rev. J. C. Cox, F.S.A., Rector of Barton-le-Street, recently called the attention of the Chancellor of York to the sale of two old fonts which formerly stood in the parish churches of Scampston and Snainton in that diocese. He received a post-card from him in reply, stating that he (the Chancellor) had no more power or wish to prevent a man selling his old church fonts, than his Chinese geese or three tons of manure. Not a very dignified answer, you will say, from one who is supposed to look after church property.* However, it is satisfactory to know that they were bought by the Rev. E. A. Pitman, F.S.A., and placed in the churchyard, Malton Priory, until they can be restored to their proper use in churches. Both fonts are plain—one Saxon and the other Norman. Arrangements have already been made for replacing the one that was ejected from the old chapel at Snainton.

S. B. CHITTENDEN.

Stevenage, May 26, 1891.

DAMP COURSES AND BUILDING BY-LAWS.

SIR,—According to the old adage, those who look on see more of the game than those who play it, and, although in most cases this may be true, 'tis not so in all—to wit, the summons I took out against a builder for using a damp course of asphalte and string is not included. The by-laws prescribe a damp course of asphalte (not asphalte and hemp) impervious to moisture, but hemp is as sensitive to moisture as salt. A combination of hemp and asphalte may be impervious for a time, but my contention is that a damp course should be as imperishable as brickwork; if it is not, then it is useless. Hempen substances protected by asphalte and deposited in a dry place may last an indefinite time; but in a damp situation, and in contact with caustic material such as lime or cement, will assuredly decay; but as the by-laws are silent on the question of durability, I could not raise that point, so the decision was given against me with five guineas costs. That decision does not, however, prove the goodness of the material, but only the weakness of the law.

I tested this question five years back, having the assistance of counsel, solicitor, and experts, but Mr. Paget decided against me because the by-law does not prescribe the thickness of the asphalte. I reported the case very fully to the late Metropolitan Board of Works, who acknowledged the receipt of the report in very complimentary terms, and in this case I sought the opinion of the Superintending Architect, who referred my letter to the Building Act Committee, who replied recommending me to take the opinion of another magistrate. The summons was heard before Mr. Curtis-Bennett. I had counsel, lawyers, a chemist, and witnesses against me, who testified that the material was all that it should be, and instanced the case of an architect who could not make a pond watertight without it,—*i.e.*, the asphalte and string. There was some confusion as to the strata in which it was formed; whether the gravel was above the clay, or the clay above the gravel, I could not understand. Well, I made a pond for myself many years ago with cement concrete, and

* It is exactly the sort of reply which might have been expected from the quarter to which the inquiry was addressed.—ED.

it holds water still; then I believe tanks and sinks are made of Portland-cement, too; then I think a dock at Liverpool was made of it, and all answer very well without a mackintosh, but a mackintosh of asphalte and string did the needful in this case, and the architect sent a letter to the maker expressing his heartfelt gratitude for having been helped out of his hydraulic difficulty, as by the aid of a mackintosh of oxidised petroleum and string it had been watertight ever since, and much other convenient testimony which I could not disprove unless by adjournment.

Complaint is made of bad building, and of the District Surveyors for allowing it. The fault is not with the men but with the law, and the difficulties they experience in its administration; and the burden of my song is, give us sensible legislation and we will protect the public. That is the explanation of the summons in this case.

T. E. KNIGHTLEY.

106, *Cannon-street, E.C.*
May 27, 1891.

COUNTER-BALANCED SASHES.

SIR,—I notice by last week's journal that a Mr. Turner has obtained a Patent for hanging sashes by a system of counter-balancing. This idea I carried into effect twenty-five years ago, and have found it answer admirably. They are to be seen in Richmond at the present time.

DAVID LODER.

*** Our correspondent is not, we believe, the only person who has taken out a similar patent. The multiplication of patents for apparently the same thing, or with only infinitesimal differences, is in fact one of the mysteries of the whole subject of patents.—ED.

The Student's Column.

VENTILATION AND WARMING.—XXI.

DEPERDITION OF HEAT.

INASMUCH as the deperdition or loss of heat for which we have to allow in designing a system of ventilation and warming depends largely upon an application of the general principles which we have considered in our last chapter, an application that affects also the problem of practically transmitting heat, it will be convenient to investigate the deperdition of heat before dealing with the transmission.

Heated bodies lose their heat either by radiation or by conduction. By radiation to other bodies of a lower temperature, by conduction to the atmosphere, in connexion with their surfaces, and to the particles of their own or other bodies with which they are in contact.

We are speaking of the deperdition of heat from a practical point of view. It must, however, not be forgotten that there is no extinction of the heat. Energy or work, like matter, never becomes extinct. We may alter its form in a variety of ways, but we can never annihilate its existence. In speaking, therefore, of the deperdition of heat, we are regarding its loss as affecting the object we have in view. For example, in warming a room by an ordinary open fireplace, we say that a portion of the heat produced by the consumption of the fuel is lost up the chimney. By this we mean that the heat, which we should desire to warm the room and its occupants, is partially employed in warming the chimney, from which in most cases we derive no direct advantage. But the heat is not extinguished; it still remains in existence, though its location and its efficiency are not in the position where they are most useful to us, and, therefore, are, as we say, lost.

So the phenomena of radiation and conduction, though causes of the deperdition of heat, have a twofold aspect. Every heated body parts with a portion of its heat, both by radiation and conduction, as long as there remains any matter of lower temperature which can absorb that heat. But by this absorption the heat is not extinct; the absorbing matter continues to manifest the same phenomena of radiation and conduction as the original heated body, and if we can utilise this secondary action we avoid the deperdition of heat.

The activity of radiation from various surfaces varies with their nature, but not with their form, while the activity of conduction to contingent cold air varies with the form of the heated bodies, but not with their surface.

The absorption of heat follows the same laws with regard to different surfaces as those of radiation, hence a surface which radiates heat rapidly absorbs it rapidly, and *vice versâ*.

At ordinary atmospheric temperatures, and with small differences between the warm and cool surfaces, the transfer of heat by radiation is simply proportional to that difference, but with high temperatures and great differences of temperature, this law does not hold, and the absolute temperature of the absorbent has to be taken into account, which is done in the investigations of Dulong and Péclet, from which we obtain the following formula.

$W = 124{\cdot}72 \cdot S \cdot 1{\cdot}0077^{t} (1{\cdot}0077^{T-t} - 1)$ where W = the amount of radiated heat per square mètre in 1 hour, T = temperature of the heated surface, t = temperature of absorbent surface, both in degrees Centigrade, and S = coefficient of radiation for the particular surface, and is therefore the measure of the activity of different surfaces. The value of S for some of the most usual surfaces is as follows:—

Polished silver	S = 0·13
Polished brass	= 0·258
Copper	= 0·16
Zinc	= 0·24
Tin	= 0·215
Polished tinned iron	= 0·45
Sheet-lead	= 0·65
Ordinary iron plate	= 2·77
Rusted ditto	= 3·36
New cast-iron	= 3·17
Glass	= 2·91
Powdered chalk	= 3·32
Wood sawdust	= 3·53
Powdered coal	= 3·42
Fine sand	= 3·62
Oil paint	= 3·71
Paper	= 3·77
Building stone	= 3·60
Plaster	= 3·60
Wood	= 3·60
Brick	= 3·60
Woollen stuffs	= 3·68
Cotton	= 3·65
Silk stuffs	= 3·71
Lamp-black	= 4·01
Water	= 5·31
Oil	= 7·24

From this table we can select the particular material which will be most suitable for any special case, according as we desire radiation from or absorption by any particular surface or wish to avoid these phenomena.

The deperdition of heat by conduction to the contingent air-surface varies we have said with the form. This may be thus explained. The air which is first raised in temperature by contact, let us say, with the lower part of a wall, on reaching the second part of the wall has a less difference of temperature between it and the wall. It, therefore, abstracts a less amount of heat per square foot from the upper part of the wall, and continues to do so as the height of the wall increases and the difference of temperature between the wall and the air diminishes. Thus, it is at once evident that those surfaces lose most heat per square foot, which admit of the ready passing away of heated air after being once in contact with them.

The general formula for transmission of heat to contiguous air is

$$W = 0{\cdot}552 \cdot B \cdot (T\text{-}t)^{1{\cdot}233}$$

where W = amount of heat transmitted in Centigrade units from the square mètre in 1 hour, T = temperature of heated body, t = that of air before contact, both in degrees Centigrade and B = coefficient, determined by the form of the heated surface.

For horizontal cylinders $B = 2{\cdot}058 + \frac{0{\cdot}0382}{r}$

where r = radius of cylinder.

For vertical cylinders

$$B = \left[0{\cdot}726 + \frac{0{\cdot}0345}{\sqrt{r}}\right] \left[2{\cdot}43 + \frac{0{\cdot}8758}{\sqrt{h}}\right]$$

where r = radius, h = height of cylinders.

For spheres $B = 1{\cdot}778 + \frac{0{\cdot}13}{r}$

where r = radius of sphere.

For vertical planes $B = 1{\cdot}764 + \frac{0{\cdot}636}{\sqrt{h}}$ where h = height of wall.

Box gives modified forms of these, for English heat units for 1 deg. difference of temperature Fahr., but these do not take account of the fact that as with radiation, so conduction from heated surfaces to the air is more active at high than at low temperatures.

The expressions in English heat units are:—

For horizontal cylinders, $W = {\cdot}424 + \frac{{\cdot}307}{r}$

where W = loss in units per square foot per hour, for a difference of temperature of 1 deg. Fahr., r = radius of cylinder in inches.

For vertical cylinders:—

$$W = {\cdot}2044 \left[\left({\cdot}726 + \frac{{\cdot}2163}{\sqrt{r}}\right)\left(2{\cdot}43 + \frac{5{\cdot}49}{\sqrt{h}}\right)\right]$$

where h = height in inches.

For spheres $W = {\cdot}3634 + \frac{1{\cdot}0476}{r}$

where r = radius of sphere in inches.

For vertical planes $W = {\cdot}361 + \frac{{\cdot}233}{\sqrt{H}}$ where H = height of plane in feet.

These expressions are simpler than those originally given, and, though less accurate with high temperatures, are sufficiently so for practical use at ordinary temperatures of atmospheric air, so that, while not applicable to the cases of stoves and furnaces, they are suitable for the walls of ordinary rooms.

Deperdition of heat results also from the conduction of heat through the substance of walls, windows, floors, roofs, &c., as well as by the activity of the processes we have been considering, and which are equally of importance, practically, in the transmission of heat or warming.

The whole process of warming and deperdition of heat thus acts. We, in some one of several ways, introduce a source of heat into an apartment which we desire to warm. Let us suppose, for example, this is a coil of hot-water pipes.

The heat is brought to our coil partly by the conductivity of the iron pipes enclosing the water, partly and principally by the circulation of the heated water. The conductivity of the pipes then transmits part of the heat of the water to the external surface, and we have a heated surface to our coil.

This heated surface then transmits its heat partly by radiation, to the walls, &c., partly by conduction to the air in contact with it. The warmed air carries on the process by imparting part of its heat to those surfaces of the walls, &c., of a lower temperature than itself.

This process will continue, if there are no disturbing influences, till the coil, the air, and the walls are of one uniform temperature, but up to this point there is no real loss of heat, though there has been plenty of transference by the activity of the operations we have been discussing.

Now, however, comes into play the conductivity of the walls, &c., by which heat is transmitted to their external surface. The external surface, being warmed, transfers part of its heat to the external atmosphere and objects, both by radiation and by contact, and every unit of heat thus transferred is lost as far as its value to us is concerned.

The rapidity of this transference varies with the conductivity of the materials of which the walls, &c., are constructed, with their thickness, and with the degree of motion of the external atmosphere. The problem is, of course, still further complicated when the walls are of heterogeneous composition or are hollow, when the windows are double, and so on, so that a considerable number of contingent possibilities have to be taken into account.

OBITUARY.

MR. ALEXANDER PEEBLES, F.R.I.B.A., CITY ARCHITECT.—We regret to announce that Mr. Alexander Marshall Peebles, F.R.I.B.A., F.S.I., the architect to the Corporation of the City of London, died at his residence at St. John's Wood, on Thursday, the 21st inst., after a prolonged illness, and, by a strange coincidence, on the fourth anniversary of the death of his predecessor, Sir Horace Jones. Mr. Peebles was born in March, 1840, at Dalsholm, near Glasgow, and was the second son of the late Alexander Marshall Peebles, of Highbury. He was articled to Mr. Thomas Smith, F.R.I.B.A., the architect to the late Marquis of Salisbury, and subsequently assisted the late Mr. Henry Baker, F.R.I.B.A., the District Surveyor of St. Pancras, and Surveyor to the estates belonging to St. John's College, Cambridge. He started in practice at an early age in Walbrook, and afterwards continued at Salters' Hall-court, Cannon-street. He was District Surveyor under the late Metropolitan Board of Works for North St. Marylebone for many years, and in that capacity was chosen to give evidence in support of an amended Building Act introduced by that body, and did much to improve the construction of theatres before they came under the control of that Board. He also rendered good service to the public in causing the improvement or vacation of the numerous underground dwellings which existed in his district. Among some of the works carried out from his designs and under his superintendence

may be enumerated Trinity Church, Stratford; the mansion, No. 1, Park-lane; the premises of the Life Association of Scotland in Pall Mall; the premises of Sir Henry W. Peek, Bart., in Eastcheap and St. Mary-at-Hill, built after the widening of that thoroughfare; the Hall of the Butchers' Company in Bartholomew Close; Rood-lane Chambers, Rood-lane; Milton Buildings, Watling-street, comprising six premises; the *Daily Chronicle* offices, Fleet-street; eleven business premises at Salisbury-court, Fleet-street; Messrs. Maclure & Macdonald's premises in Queen Victoria-street; the restoration of St. Stephen's Church, Walbrook; premises in High-street, Young-street, and Ball-street, Kensington, for Messrs. John Barker & Co.; premises in Fore-street and Whitecross-street; Messrs. Judd & Co.'s premises, Doctors'-commons; Messrs. Wrigley & Co.'s premises, Budge-row; No. 25, Walbrook, Messrs. Linklater & Co.'s offices; premises in Bond-court, Walbrook, &c., &c. Mr. Peebles had travelled considerably. In 1886 he was a candidate for the appointment of Superintending Architect to the Metropolitan Board of Works, but was defeated by Mr. Thomas Blashill by one vote only. He was afterwards promoted as Surveyor to the vacant district of East Hampstead. He held the appointment of Architect and Surveyor to her Majesty's Lieutenancy of the City of London, to the Trustees and Churchwardens of the parish of St. Stephen's, Walbrook, and to the Select Vestry of St. Mary-at-Hill; Honorary Architect to the Directors of the Royal Caledonian Asylum; and Honorary Surveyor to the Court of the Royal Scottish Hospital. In 1887 he was appointed Architect to the Corporation of the City of London, and thereupon relinquished his practice and other public offices. He was in his fifty-second year, and was buried at Kensal-green on Monday last. The following works by Mr. Peebles have been illustrated in our pages on the dates named:—Offices for the Life Association of Scotland, Pall Mall, June 4, 1881; Hall for the Butchers' Company, July 26, 1884; and premises for Sir Henry Peek, Eastcheap, June 27, 1885.

MR. HARRY OLIVER, F.R.I.B.A.—The death is announced of Mr. Harry Oliver, F.R.I.B.A., District Surveyor of Whitechapel and Spitalfields. He was elected an Associate of the Institute in 1849, and a Fellow in 1862.

MR. HENRY CURZON, A.R.I.B.A.—The death is also announced of Mr. Henry Curzon, A.R.I.B.A., of Tenbury, Worcestershire.

GENERAL BUILDING NEWS.

CHAPEL OF ST. MARY-THE-VIRGIN, BRONDESBURY PARK, BRONDESBURY.—The foundation-stone of the new Chapel of St. Mary-the-Virgin, Brondesbury, was laid on Tuesday last by the Bishop of Marlborough. The chapel is being built in connexion with Miss Clarke's ladies' school in Brondesbury Park, and is the gift of one of the former pupils, Miss Agatha Skinner. The design is simple late thirteenth-century work, with apsidal chancel end. The windows are deeply recessed, with drop arches and shafted jambs internally. The altar is raised seven steps from the nave-floor level. The sanctuary steps are of white Sicilian marble, and the floor is designed to be carried out in glass mosaic. The roof is open-timbered, the principals being carried on to caps of shafted corbels. Accommodation is arranged for 160 adults. A partially-glazed corridor, fitted with seats and flower-shelves, connects the chapel with the school. The materials used are Box Ground and Corsham Down stone and red brickwork. The estimated cost of the building, with necessary fittings, is about 2,500*l*. The architect is Mr. Geo. H. Fellowes Prynne, A.R.I.B.A., of 10, Torrington-square, London. The builders are Messrs. J. & C. Bowyer, of Upper Norwood.

THE MANCHESTER "PALACE OF VARIETIES."—This new building, which was formally opened on the 15th inst., has two frontages, the principal one to Oxford-street, and the other to the new thoroughfare known as Whitworth-street. In several respects it follows the features of the Irving-Darbyshire "safety" plan recently carried out at the new theatre at Exeter, but its main point of divergence is the addition of a second tier of seats called amphitheatre in place of the old "gallery." The principle of isolation which has been adopted as a *sine qua non* by the Manchester County Council has been adhered to. The pit portion of the theatre is below the street level, so as to reduce the height of the amphitheatre as much as possible from the street level. Each portion of the house has its exits communicating directly with the streets. The pit has four exits, counting the entrance one, the grand balcony three, and the amphitheatre four. All the passages, floors, and staircases used by the public and the artistes are of iron and concrete. According to the *Manchester Courier*, the auditorium has been placed parallel with the proscenium instead of as a prolongation of it; or, in other words, the architects have returned to the old Greek form of the semi-circle, which brings the audience nearer to the stage, the proscenium opening being widened to accommodate this expansion of the auditorium. Having decided upon this method of planning, the next point of interest, following the Greek model, was uninterrupted sight lines from each seat. This object has been secured in the following manner:—The eight large columns supporting the superstructure of the two tiers are set back, and the girders resting on them are of a cantilever character, with an overhang for the balcony above. The coupled columns supporting the amphitheatre stand on the back of these cantilever beams, at a position which, for clearness of explanation, may be said to represent the position of the circular wall forming the passage at the back of the old theatre tiers, and through which access is obtained to the seats. There are thus no columns in the circle, and, as there is no tier above the amphitheatre, that portion has a free and uninterrupted view of the stage, and of the top portion of the great auditorium. The ceiling is formed by a large "cove," from which springs an elliptical dome at 60 ft. from the floor. The auditorium is 90 ft. wide, and 66 ft. deep, the stage is 66 ft. by 40 ft. deep, and the proscenium opening 36 ft. wide by 32 ft. 10 in. high. The highest point the audience can reach from the street is 33 ft. 6 in. Carrying out the principle of isolation in detail, in the interior of the building there is no opening of any description except the stage opening in the proscenium wall. The members of the orchestra have a separate entrance and exit from the streets, and the manager passes to the auditorium by a door in the immediate proximity of his own room. The large proscenium opening can be closed in ten seconds by what is described by the journal before-mentioned as a fire and smoke-proof curtain made of the new material, "Titancrete," which has a light specific gravity, and is unburnable. The stage is roofed with the same material, and an immense funnel is formed in the centre which (it is said) will absorb all smoke or poisonous gases in case of conflagration. The artistes are placed on either side of the stage, which is shut off by an automatic Titancrete door, and the dressing-rooms in each wing have an escape staircase which leads direct to the streets. The fly men and paint-room men are similarly provided for, and the stage itself has two exits direct to the streets. All the exit doors are fitted with Kaye's patent automatic exit fittings. In designing the palace, we are told that the architects have been anxious to add something to the street architecture of Manchester, which should not only have dignity and plenty of light and shade, but should, if possible, possess the additional charm of colour. With a view to secure this latter desideratum they decided to attempt a revival of the exterior decoration practised by the Italians of the sixteenth century, such as *Gesso duro* and *Sgraffito*. Italian artists were employed, and, under the guidance of Signor Marolda, this portion of the work has been carried out with a remarkable degree of success. The building has been faced with self-coloured cements. The *Sgraffito* is in red and gold colour, the *Gesso duro* ornament was modelled *in situ*. The general character of the architectural features is Palladian. The internal decorations consist of fibrous plaster ornament in relief, and the colour scheme is cream, gold, and scarlet. The object has been to secure brightness without vulgarity. *Sgraffito* work has been again used in the large coved panels connecting the dome with the walls. The decorative and upholstery work has been carried out by Messrs. Heighway & Son, of Manchester, and Messrs. Heighway & Depree, of London. The theatre has cost a little over 40,000*l*., and the contract has been carried out by Messrs. William Brown & Son, of Salford. The marble mosaic floors and staircase have been supplied, and the heating and ventilating carried out, by Messrs. Elliot & Co., of Manchester; the ironwork by Mr. John Jones, of Manchester; and the electric light and fittings by Rashleigh, Phipps, & Dawson, of London. The constructive ironwork was executed by Messrs. Bellhouse, with Mr. E. Muir as consulting engineer; and the stage has been built by Mr. Morley. The whole undertaking has been carried out from the designs and under the immediate supervision of the architects, Messrs. Alfred Darbyshire, F.R.I.B.A., and F. Bennett Smith.

NEW BOARD SCHOOLS AT CADOXTON-BARRY.—The formal opening of the new Board School buildings erected on Cadoxton-common by Mr. D. Davies, of Cardiff, at a cost of 4,500*l*., for the Cadoxton and Merthyr Dovan School Board, took place on the 23rd inst. The architects were Messrs. Seward & Thomas, of Cardiff, and the contractor was Mr. D. Davies.

THE PROPOSED NEW WORKHOUSE FOR HASTINGS.—An animated discussion took place at the ordinary meeting of the Hastings Board of Guardians on the 21st inst., when tenders were received for the building of the proposed new workhouse. The highest tender was 99,891*l*., and the lowest 78,850*l*. The surveyor's estimate was 85,000*l*., and the sum of 10,000*l*. has already been spent on the site, and, as the chairman observed, the extras, such as furnishing, &c., would bring the total cost up to about 100,000*l*. Several of the guardians complained strongly against such a heavy expenditure, one saying he was given to understand the cost would not be more than 50,000*l*., and suggesting that they should tell the Local Government they were not in a position to incur such an enormous expenditure. Eventually the whole matter was referred to the building committee to consider and report.—*Sussex Daily News.*

WESLEYAN CHAPEL AT MARKINGTON, NEAR RIPON.—On the 22nd inst. a new Wesleyan chapel was opened in the village of Markington, near Ripon. The style of architecture is simple Gothic. The chapel will seat about 180 worshippers. A school-room, vestry, and stabling, and other conveniences have been added. The total cost has been about 1,500*l*. The building has been erected under the supervision of Mr. Wm. Croft, of Killinghall, architect.

HOME FOR CHILDREN, CORSTORPHINE, EDINBURGH.—The new home of the Scottish National Society for the Prevention of Cruelty to Children at Corstorphine is now practically completed. The building, which has been erected at a cost of about 4,000*l*., is in the Elizabethan style, and will accommodate a hundred children. The boys will occupy one wing and the girls the other, but at school, at meals, and in the playgrounds, the sexes will be allowed to mingle. The dormitories, of which there are four, two for each wing, are fine apartments, each providing room for twenty; and, besides these, there are bedrooms for the infants. The dining-room will be used alternatively as a schoolroom, and on the ground floor there is a large recreation room for use in wet weather. The architect is Mr. James Jerdan, George-street, Edinburgh.—*Scotsman.*

NEW CHURCH, LONGTON, STAFFORDSHIRE.—The opening and dedication of the new church of the Holy Trinity at the Meir, Longton, was performed on the 21st inst., by the Bishop of Shrewsbury. The new church is erected upon a site given by the Duke of Sutherland, in a growing district, in the parish of Caverswall. At present there is only a temporary chancel, but when the church is completed it will accommodate about 400 people. It will then consist of a chancel, nave, north and south transepts, vestry, and organ chamber. The estimated total cost is about 2,000*l*. The church is in the Early English style, and is constructed of red brick, with stone facings. At present there is seating accommodation for about 260 persons. The plans were prepared by Messrs. R. Scrivener & Sons, of Hanley, and the contract was executed by Messrs. H. & R. Inskip, of Longton.

NEW ABATTOIRS, ACCRINGTON.—The public abattoirs, erected by the Corporation, on Ellison's Tenement, Accrington, were opened on the 1st inst. by the Mayor of Accrington, Alderman Whittaker. The new abattoirs are erected on land belonging to the Corporation, at the junction of Hyndburn-road and Moreton-street, and immediately adjoin the new stables. The entire block, including approaches, out-buildings, and enclosed land for future extensions, covers an area of 3,644 square yards. The buildings are arranged in three blocks or rows; that abutting upon Moreton-street contains one large slaughter-house and lair for cattle, the pig department consisting of slaughter-houses, cooling-room, piggeries, and boiler-house. The other two blocks contain nine and eight slaughter-houses and lairs respectively, and are built parallel to Hyndburn-road. To the right of the entrance is the inspector's house, &c., and at the end of the yard an offal pit and shed. The buildings are divided by paved roadways or alleys. The entrance is from Moreton-street. The buildings have been constructed of stone. The front walls are of pitched faced fronts from Haslingden-grange. The walls are erected on 6-in. footings on a concrete foundation. The division walls are of 9 in. brickwork, and the inner walls throughout are in Portland cement mortar. A dado is formed in each slaughter-house and lair, to a height of 6 ft. 6 in. above the floor level. Staffordshire blue facing bricks have been used for the base or skirting; the remaining portions of the dado are constructed of salt glazed bricks. The upper portions of the walls are of red bricks. The lairs to each slaughter-house are divided for beasts and sheep. The floors of the slaughter-houses and sheep-pens are flagged, the rest of the lair floors being paved with Warmden setts. The drainage and ventilation, it is stated, have received careful attention. The roofs are under-boarded and painted. The outside doors are made to slide by means of wrought-iron hangers and running pulleys on rails fixed over each door lintle; and each lair is provided with a loft for the storage of provender. Each slaughter-house is provided with iron joists; suspended from these by brackets are the galvanised running rails, with their completement of running pulley hooks and chains, all galvanised, for hanging the carcases of the beasts, &c. The doors dividing the slaughter-houses from the lairs are ¼ in. boiler plating, sliding, similar to the outside doors. A verandah is fixed in front of every slaughter-house to protect the doors and ironwork from the weather. Near the stables, and adjoining the piggeries, is the boiler-house, fitted up with a 12 ft. by 5 ft. Cornish steel boiler, with a working pressure of 80 lbs. on the square inch, supplied by Messrs. Anderton & Sons, Antley. The buildings are lighted from the roof by rough-plate glass, and gas and water is laid on to each place. The alleys or streets are lighted with bracket-lamps, and there are the usual drinking-troughs for the cattle. Hydrants are also

fixed for flushing and cleansing purposes. An offal-pit and galvanised offal-carts with sliding doors are also provided. The inspector's house at the entrance contains parlour, living room, scullery, and three bedrooms. The entire cost of the work, including the stable block, will be about 15,000*l.* Messrs. Moore Bros., Rawtenstall, are the contractors; Messrs. Carter & Sons have executed the plumber's work, steam fittings, verandah, &c.; Mr. Henry Wormwell the ironwork and smith's work; and Mr. J. W. Bridge has supplied the hoists, offal-carts, &c. The stables and abattoirs have been erected from plans and under the superintendence of the Borough Engineer, Mr. W. J. Newton.

BISCUIT MANUFACTORY, CARLISLE.—A new biscuit factory, which has recently been erected for Messrs. Carr & Co., has just been opened at Carlisle. The buildings of the new factory are reached from Bread-street, and have a floor space of about 78,000 ft., and consist of four floors in addition to the basement. A large portion of the basement floor will be used as store-rooms. This space is lighted and ventilated by swing windows on the south and east sides in front of continuous areas. The buildings are divided on the ground floor into six sections, the largest section having an area of 18,455 ft., and is set apart for long travelling ovens in conjunction with the patents machine-room, the bakehouse being a one-story wing on the west of the main blocks, with a fire-proof roof. A second large bakehouse, with patent decker ovens, is on the south of the patents machine-room, with warehouse adjoining. A cloak-room and lavatory for the men and boys has been erected in the enclosed yard at the end of Bread-street. The boiler-house and engine-house are both separate buildings, on the south side of the one-story bakehouse, with fireproof construction, the former having a "Galloway" boiler and one of Green's patent economisers to warm the water with the waste heat from the furnaces. The engine-house is finished in coloured glazed bricks and Robinson's cement, and has a deep pit over the whole area in which there has been constructed a long bed for the engine, and a small one adjoining for the dynamo. The steam-engine was made by Pratchitt Brothers, Carlisle. The buildings will be lighted by the electric light, which has been supplied by Messrs. J. H. Holmes & Co., of Newcastle-on-Tyne. The dynamo is fixed in the engine-house. On the first floor there are two large rooms, viz., strong warehouse, capable of storing 1,500 tons of flour, and icing-room over the hand oven bakehouse. The second floors are arranged for packing-rooms and packing warehouse, a small portion being over the railway siding adjoining the premises. The top floors are principally for storing material. A railway siding has been laid into the works from the private railway into Messrs. Carr & Co.'s premises. At the south-west corner of the site is the water-lodge and refrigerator, also the tall chimney-shaft over 170 ft. high. The architect was Mr. T. Taylor Scott, of Carlisle. Messrs. Johnstone Bros. were the builders.

SANITARY AND ENGINEERING NEWS.

SUBWAYS SCHEME FOR SHEFFIELD.—At a meeting of the Highway Committee a few days ago, the report of a sub-committee appointed to consider the question of having subways in the centre of the town was submitted, and the Borough Surveyor presented plans and sections of the suggested subways, which are from below Change-alley, along High-street and Fargate to Cheney-row, and from the Pack Horse Hotel, Snig-hill, along Westbar to Corporation-street. The objects are to provide improved sewers, and accommodation for gas and water mains, electric and telephone wires, pneumatic tubes, &c., and to make side chambers to the respective properties along the routes for the conveyance of house drainage, and the private gas and water services and telephone communication. It is proposed, further, if found desirable, to construct vaults under the footpaths for the convenience of the different occupiers of property, which would be let to them at a rental. It was mentioned that this system of subways, &c., had been extensively adopted in Nottingham for years, and applied to many of the new thoroughfares in the metropolis with most satisfactory results; one great advantage being that it saved the surface being disturbed from time to time. The sub-committee's report was adopted, and it will, therefore, bring the matter before the Council at their next meeting.—*Sheffield Independent.*

THE EDINBURGH WATER SUPPLY.—Following the advice of Messrs. James Mansergh, C.E., of London, James M. Gall, C.E., of the Glasgow Water Trust, and George Hill, C.E., of Manchester, the water authorities of Edinburgh are bestirring themselves with a view to securing new sources of supply for that city. Edinburgh is not a place of very rapid growth, its population having increased only from 254,000 in 1870 to 366,468 in 1891, but even this growth at the same rate will require additional supplies of water ten and twenty years hence,—and even sooner. Looking to the future, therefore, and realising that new sources and new works are not to be obtained in a day, the Water Trust of Edinburgh commissioned the three engineers named to consider the present state of affairs, and the probable future requirements. The results have been recently presented in the form of a report, and are thus summed up:—"The existing waterworks are competent in a period of average rainfall to supply about 15,000,000 gallons per day. In a dry period they will supply only 13,732,542 gallons a day, and, in an excessively dry year like 1870, the yield may be brought down for six months to an average per day of 12,679,542 gallons. The present consumption is practically the 15,000,000 gallons which the works can supply. For 1890, it was given at 14,794,000 gallons. Of this the quantity used for trade and public sanitary purposes, is 3,381,110 gallons, leaving for domestic purposes, 11,412,890 gallons. On a population, according to the 1891 census returns of 366,468, the trade, &c., consumption is 9·22 gallons per head per day (1·28 of which is public sanitary), and the domestic, 31·14 gallons,—making a total of 40·36 gallons. By the investigations we have made, we find that the water-fittings are of defective make and in bad order, but that on repair the domestic consumption can be diminished for a short time by 6·44 gallons per head, reducing the 31·14 to 24·70. We are of opinion that if proper measures, such as we recommend, are taken to discover and stop the preventible waste, the domestic consumption may be brought down to 24 gallons per head, including the 1·28 gallons now used for public sanitary purposes. Deducting the 1·28 gallons from 19·22 gallons there is left 7·94 gallons as the trade supply by meter or agreement. We therefore say the present consumption for all purposes should be 24+7·94=31·94 gallons per head per day. In forecasting future requirements we assume that the domestic consumption (with the public sanitary) can be brought down to 24 gallons per head per day in three years. On these premisses, it follows that if a very dry period were to come now, you would be short of water in 1891 and 1892, that if the fittings are made right in three years you would have a small surplus in 1893-4-5 and 6, but that in 1897 the means of supply would be in defect of the demand, and would become increasingly so every succeeding year. Under these circumstances, it is imperative that you proceed at once to provide for bringing in an additional supply. We therefore recommend that your engineers proceed immediately to obtain such further information with regard to the several schemes already reported on by them, as will enable us to advise jointly with them as to which of the schemes should be adopted." The report is very exhaustive and instructive, and has effectually aroused the Water Trust to the position in which they are or may find themselves.

DRAINAGE SCHEME, PONTYPRIDD.—A meeting of the Pontypridd Local Board took place on the 21st inst., when the question of the subsidiary drainage scheme was discussed. It was decided to apply to the Local Government Board for sanction to borrow 25,000*l.*, repayable in thirty years, for the purpose of carrying out the undertaking.

FOREIGN AND COLONIAL.

FRANCE.—The Société des Beaux-Arts of the departments has been holding its fifteenth sitting, from the 22nd to the 27th of this month, under the presidency of the Minister of Public Instruction. ——The nineteenth annual congress of French architects will be held at Paris from the 15th to the 20th of June.——The Société Régionale of the architects of the North of France has founded medals for presentation to art-workmen of French nationality domiciled in the Departments du Nord, Pas-de-Calais, and La Somme.——The tenders for the work required for the utilisation of the sewage of Paris in the Plain of Achères have been accepted. The works include the construction of an aqueduct over the Seine opposite Argenteuil.——All the works commenced by Chapu and left unfinished in his studio are to be completed by or under the direction of MM. Dubois, Falguière, and Mercié. Among the number is the bust of Duc, the architect, for the Palais de Justice of Paris, two marble statues for the Hôtel de Ville, the statue of Balzac commissioned by the Société des Gens de Lettres for the Palais Royal, and lastly that of Lord Byron, intended for Greece.——The Académie des Beaux-Arts have elected as corresponding members, in the section of Architecture, M. Martenot, of Rennes, in place of the late M. Durand of Bordeaux, and Mr. Waterhouse, of London, in place of the late M. Sarti of Rome. At the same sitting the Académie awarded the Prix Deschaume to a young architect, M. Bouché.——The inauguration of the Garibaldi monument at Nice, designed by M. Deloze, has been adjourned to September. ——The retrospective exhibition at Pau proves to be very interesting. There are about two thousand different objects, including paintings, sculpture, tapestries, goldsmiths' work, ceramic ware, &c.—— M. Léon Majour, a government architect ("diplomé") has obtained the first premium in the competition at Melun for the construction of a building for the departmental archives of the Seine and Marne.——M. Marquet de Vasselot, the sculptor, has been commissioned to execute a marble bust of Maréchal Suchet for the Hôtel of the Préfecture of Lyons.——M. Armand Dayot, Inspecteur des Beaux-Arts, has been commissioned to organise a modern and retrospective exhibition to be opened at St. Brieue on June 13.——At Dax on the 21st of the month, the statue of the mathematician, Borda, was inaugurated by the President of the Republic. The statue, the work of M. Aubé, is erected on the Place de la Halle, by the side of the Cathedral.—— Two disgraceful acts of vandalism are among the records of the week; one of the fine windows of the Cathedral of Chartres has been broken by persons forcing an entrance into the cathedral; and a fine statue ("Laïs") in the Tuileries garden has been wilfully damaged.——A Belgian Committee has been formed to erect a monument at Antwerp to the memory of French soldiers who died there in 1832, fighting the emancipation of Belgium.—— M. Ferrary, author of the statue of Phryne which figures this year at the Champs Elysées, has been commissioned to execute a marble bust of Mehul to be erected at Givet (Ardennes), the birthplace of the musician.——The death is announced of M. Viel, member of the Société Centrale des Architectes since 1848. M. Viel, who was seventy-seven at the time of his death, was a pupil of Hippolyte Lebas and of Labrouste, and had assisted in the carrying out of the old St. Lazare railway-station. Otherwise he had principally occupied himself with works of domestic architecture.

A NEW INTER-SCANDINAVIAN RAILWAY.—A plan is being promoted by a syndicate of English capitalists for the construction of a line of railway from the Ruativare and Wallati iron deposits and the Alkavare and Silbatto silver mines in Swedish Lapland, to the sea border of Norway. The former deposits are very rich in iron, and cover some 4,000,000 square feet. The railway would be constructed on the Decauville system, and is estimated to cost 200,000*l.* The cost of breaking out the ore is estimated at 7d. per ton, and this and the transport of the ore to the coast at 3s. 8d. per ton, being only one-half of the cost at present of the celebrated Gellivara ore in the port of Lulio on the Baltic.

AN EIFFEL TOWER ON MOUNT PILATUS.—According to the *Tageblatt* of Luzerne, a scheme is being prepared by certain Swiss *entrepreneurs* for the erection of an Eiffel Tower on the summit of Mount Pilatus, whither there is now a railway. It is asserted that the clouds so often marring the view from the top only have a height of some 30 mètres, and it is therefore proposed to erect a tower near the Hôtel Bellevue, 280 mètres in height, whence generally there would be a splendid view of the Alps. It is intended to build the tower of steel, and it is to be composed of two open-work cylinders, the ascending and descending paths lying between them. The top platform would afford accommodation for some 400 persons, and also boast a restaurant.

MISCELLANEOUS.

A MASTER BUILDERS' ASSOCIATION FOR CORNWALL.—A meeting of master builders of the county of Cornwall (convened by circular by Mr. James Julian, of Truro), was held last week, at the Red Lion Hotel, Truro, to consider the desirability of forming a local association to act in conjunction with the National Association of Master Builders of Great Britain. Most of the large builders and contractors attended, viz., Messrs. Thomas Lang (Lang & Sons, Liskeard), Mr. Trehane (Liskeard), Mr. Carkeek (Redruth), Messrs. James Julian & Harris (Truro), and also representatives from Fowey, Camborne, and St. Ives. Mr. Lang was voted to the chair, and explained the objects in forming such an Association. Correspondence and various rules of other builders' associations throughout the country were read by Mr. Julian, when it was unanimously resolved: "That in the interests of the building trade it is desirable to form a County Local Association, and that a committee consisting of five be appointed to meet at an early date to draw up rules and regulations for the formation of the association, to be presented at another general meeting of builders for approval, the committee consisting of Messrs. Lang, Trehane, Julian, Carkeek, and Caldwell (of Perkins and Caldwell, Penzance)."

THE ENGLISH IRON TRADE.—There is very little business stirring in any of the branches of the English iron market, and the prospects for the future are far from bright. Scotch warrants are still held up and are very scarce, but makers' iron remains quiet, and practically unchanged in value. Middlesbrough pig is 1s. lower on the week, and mixed numbers of Bessemer iron in the north-west have been lowered 1s. 6d. per ton to 52s. to 53s. The manufactured iron trade remains quiet, and the probable partial stoppage of the Eston works is an indication that work is very slack in the north of England. The market for tin plates is a trifle firmer. There is but little life in the steel trade, although shipbuilding material is in slightly better demand, owing to the prospects of orders for new vessels shortly coming to hand. Engineers are fairly well employed, but new inquiries are only coming forward slowly.—*Iron.*

THE SWEDISH SAMPLE OFFICE IN LONDON.—The Swedish Government has granted a sum of 650*l.* to the Swedish Export Association towards the establishment of a sample office of Swedish manufactures in London.

CONTRACTS AND PUBLIC APPOINTMENTS.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Forming and Laying-out of a Public Park	Stockton-on-TeesCorp.	K. F. Campbell	June 1
*Re-laying Pipe Sewer	Waltham Holy Cross Local Board	C. W. Wiggs	do.
*Water Drain, Manholes, &c.....	Mortlake Dist. Highway Board	H. Richards	do.
Waterworks.....	Shipley Local Board	W. B. Woodhead & Son	June 2
Painting and Colouring the Union Workhouse, Torpoint	St. German's Union..	.....	June 3
Four Cottages, &c. Ward's Yard, Northallerton	.....	P. Horne	do.
Laying 12 miles of 24 in. and 18 in. Gas Mains	Sunderland Gas Co. ..	.....	do.
350 yds. of 9 in. Pipe Sewers, &c. Newton, Blaenau, Gwent	Abertillery Local Bd.	*Official*.....	do.
400 yds. Cube of Guernsey Granite, Royal Engineer Yard, Mill Lane, Woolwich..	War Department	do.	do.
*Paving &c. Works.....	Hove Commissioners	do.	do.
*Road Making and Paving Works	Fulham Vestry	W. Sykes	do.
Six Villa Residences, Sowerby Bridge	.....	Lloyd & Son..	June 4
Alterations and Additions to Dispensary Building in the Houndwell, South'pton	Guard. of the Poor	.....	do.
Altering and Improving Christow Bridge	Devon County Council	H. Harbottle	do.
Alterations, &c. to Brynhytryd Baptist Chapel, Ebbw Vale.....	The Trustees.....	L. Samuel	do.
Rails, Sleepers, Fishplates, and Bolts and Nuts.....	H. H. the Niz·m's Guaranteed State Railways Co..	.....	do.
Paving, Curbing, and Channelling, Culvert-street, Newent	Newent Local Board	.....	do.
Relining in Brickwork of Reservoir, at Highfield, Pendleton	Borough of Salford..	*Official*	June 5
*Cottages and House, Timber Drying Shed	M. R. Co.	do,	do.
*Cleaning and Painting Stations, &c.....	do.	do.	do.
*Wood Paving Works	Commrs. of Sewers ..	do.	do.
Dwelling-house and Blacksmiths' Shop, Bovey Tracey, Devon	J. Moore	Samuel Segar	June 6
House at Lustleigh, Devon	J. Elliott	do.	do.
Painting and Cleaning Schools, Gateshead	The School Board	.....	do.
Repairs and Alterations to Taibach Bridge	Glamorgan C. C.... ..	.....	do.
*Private Waterworks, Bean Manor Park and Woodhouse	.....	G. Hodson.....	do.
Hospital Block, Stirling District Asylum, Larbert	.....	A. & W. Black.....	June 8
Additions to Bartestree Court, near Hereford	.....	Nicholson & Son.....	do
Re-construction of Pipe Sewerage, Sneyd Park, near Bristol.....	Barton Regis U.R.S.A.	A. P. J. Cotterell	do.
Extensions to School, Walton-on-the-Hill, Lancs.	The School Board	E. Kirby	do.
*Swedish Yellow Deal Wood Paving Blocks	St. Marylebone Ves...	*Official*	do.
*School at Manor Park.....	East Ham School Bd.	R. L. Curtis.....	do.
*Painting Wellington Barracks	War Department	*Official*	June 9
*Water Supply Works.....	Newton Abbott U.R.SA	S. Segar	do.
*Paving High-street, Stratford	West Ham Council ..	Lewis Angell	do
*Roadmaking and Paving Works.....	Willesden Local Board	O. Claude Robson	do.
*Pipe Sewer and Surface Water Drains, &c.	do.	do.	do.
*Steel Girder Bridge.....	do.	do.	do.
*Supply of School Furniture	Walthamstow Sch. Bd.	*Official*	do.
Steelwork, &c. for Bridges, Steel Bearing Plates, &c.	India Office	.....	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Enclosing Show Yard, erecting Grand Stand, Horse Boxes, &c. Exeter	Exeter Horse Show Society.....	W. S. Croote	June 9
Infirmary at the Workhouse, Ecclesall Bierlow, Yorkshire	The Guardians	T. G. Edwards.....	do.
*Supply of Road Material	Lewisham B. of W. ..	*Official*	do.
*Reconstruction of Sewer.....	Mile End Old Town Vestry	J. M. Knight	dc
Wesleyan Chapel, New Ferry, Birkenhead	Building Committee..	T. W. Cubbon	June 10
*Timber, Iron, and General Building Materials	War Department	*Official*	June 12
*Postal Sorting Office at Forest Gate	Com. of H.M. Works	do.	do.
*Additions to Stables	G. E. Ry. Co.	do.	June 13
House of Recovery, Meanwood, Leeds....	Governors	W. H. Thorp.....	June 15
*Gas Engines, Pumps, and Machinery	Hendon Local Board ..	S. S. Grimley	do.
*Construction of Main Outfall Sewer, &c ..	do.	do.	do
*Building Materials	School Bd. for London	*Official*	do.
*Road Works	Hanwell Local Board	do.	June 16
*Removal of Dust and Ashes	Acton Local Board....	do.	do.
*Sewerage Works	Tottenham Loc. Bd..	J. E. Worth	do.
*Wood Paving	Strand Board of Works	*Official*	do.
Enlargement of Butlock's Heath School	Hound School Board..	W. B. Hill.....	June 17
*Sewerage Works	East Barnet Valley Local Board	G. W. Brunnell	June 22
*Dredging Works	Medway Conservators	*Official*.....	do.
Repair of Roads at Public Bridges.....	Lancaster C. C.	do.	June 30
*Erection of Stables, &c. Hoddesdon	County of Hertford ..	Urban A. Smith	No date
Stone-Walling, &c, A New Coal-House ..	Aberdare Gas Co.	.....	do.
Residence, near Neath	.....	J. Buckley Wilson & G. Moxham.....	do.
Adapting Premises for use as Infants' School, Bedwellty, Mon.	School Board	.....	do.
Business Premises, Newport, Mon.	A. W. Bland.....	Habershon & Fawckner	do.
Rutherford College, Newcastle-on-Tyne ..	.....	Oliver & Leeson	do.
Hotel at Blaen Llynvi, near Maesteg	.....	G. F. Lambert.....	do.
School, Latrines, and Playground, &c. Carlisle	School Board	T. Taylor Scott	do.
Sewering, Levelling, Paving, Metalling, &c. Streets, Hoole	Local Board	C. A. Ewing	do.
Brick Gasholder Tank, West Stanley Colliery	.....	.....	do.
Alteration and Enlargement of St. Mark's Church, Low Moor	.....	Healey & Healey.....	do.
Three Houses, Commercial-road, Halifax..	.....	R. Horsfield	do.
Stabling and Alterations to House, Great Bowden, near Market Harborough	.....	William Hull	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Applications to be in
*Assistant Inspector of Nuisances	Vestry of St. John's, Hampstead.....	100*l.*	June 3
*Clerk of Works	Wood Green Local Bd.	2*l.* 10s. weekly	June 6
Sanitary Inspector and Surveyor	Bradfield U.R.S.A.....	200*l.*	June 15
*Surveyor	Ilfracombe Loc. Bd...	.....	June 22
*Clerk of the Works	Essex County Council	.....	No date

Those marked with an Asterisk (*) are advertised in this Number. *Contracts, pp.* iv., vi. *and* viii. *Public Appointments, p.* xx.

SCOTCH ARCHITECTURAL PARTNERSHIP. — Mr. Alexander Brown has removed his office to No. 17, Union-terrace, Aberdeen, and, having assumed his assistant, Mr. George Watt, as partner, the business will now be carried on under the firm name of "Brown & Watt."

ROYAL STATISTICAL SOCIETY.—At a meeting of this society, held on Tuesday last, the President, Dr. F. J. Mouat, F.R.C.S., LL.D., in the chair, a paper was read by Dr. Venn, of Caius College, Cambridge, on "The Nature and Use of Averages." The general object of the paper was to show that the prevalent habit of almost implicit reliance upon the common arithmetic mean or average of a number of magnitudes, perfectly justifiable as it is in many cases, needs some revision and caution. An average of any kind,—and there may be many kinds, for any intermediate value, obtained by some definite rule from a number of various magnitudes, is a mean or average,—is simply a single fictitious substitute of our own for the plurality of actual values which we have before us. It is impossible that it should adequately take their place for purposes in general, but must be employed to fulfil this or that special purpose; and the particular kind of average to be selected must depend upon the particular kind of purpose in view.

ROYAL CONSIDERATION FOR ARCHITECTS.—According to the *Pall Mall Gazette*, the Queen of Spain's reason for retarding the completion of the palace which is being built at San Sebastian has at last been divulged. The palace is built privately by the Queen, and it is in order to prevent overdrawing her banking account that she has determined to have the building finished only in the course of next year, when she is able to pay the architects.

SUBSIDENCES IN CHESHIRE.—So far from accepting the decision of the House of Commons,—as described in the *Builder* of May 2 (p. 359),—upon the Bill for providing compensation for subsidences through brine pumping in the "salt districts," the Salt Union are resolved to again contest the measure, and with renewed energy, in the House of Lords. The Bill, as it left the Commons, authorises the formation of compensation boards, who shall have power to levy a rate not exceeding 3d. per 1,000 gallons of brine pumped per annum, out of which tax owners of property damaged by subsidence shall be compensated. This compensation is, however, by amendments in Committee and new clauses, withheld from railway and canal companies (who benefit by the salt traffic), County Councils, and other local authorities, gas and water companies, and persons deriving rents or royalties from brine pumping; compensation going only to owners of property who have no direct interest in the industry from which they sustain injury. The Committee, it may be remembered, accepted little or no scientific evidence on the question whether these subsidences were or were not really due to the pumping, taking the view that millions of tons of salt could not be taken away without some damage being done. The Salt Union make this one of their strong grounds of contention, and they intend to put forward all the scientific evidence they can induce the House of Lords Committee to receive. In this connexion they assent that "in the opinion of eminent scientific men who have specially studied the subject, the subsidences cannot be entirely due to brine pumping, because if brine pumping ceased altogether, subsidences would occur from purely natural causes, as they have in fact occurred in olden times before brine pumping was commenced, and as they do in fact occur at the present time at places so far away from any pump as to make it certain they are not caused by pumping." The Bill provides that compensation shall be given for damage after the passing of the Act, and that the maximum rate shall be levied in the first year; and upon this the Salt Union complain that under that condition compensation will have to be imposed before any evidence is brought that fresh damage has been caused by brine pumping, or any claims can be investigated, and, therefore, the brine-pumpers will in effect be compelled to provide an advance compensation fund, thus offering encouragement to claimants who have acquired their properties with known liability to subsidence, whilst others have built on ground known to be sinking. They also argue that it is manifestly unjust that the present brine-pumpers should have to provide compensation for damage which, though happening after the passage of the Act, has been mainly owing to natural causes, aided possibly by the old workings and excavations by former proprietors.

THE CENTRIC PEN.—This is a pen made with a flat shoulder above the nib, fitting into a slit on the central axis of the penholder. The object is to fix the pen so that no ink can run up to the fingers, and the pen can be laid down without the ink coming in contact with the table.

NORWEGIAN TRAVELLING STIPENDS. — The Norwegian Government has granted stipends amounting to 500*l.* to various gentlemen for the purpose of studying certain subjects abroad, including one to Herr Erling Utne for studying architecture; and one to Herr H. Seckusen for studying the dressing of stone for architectural purposes abroad.

A LARGE CLOCK.—The New York *Architecture and Building* says that "the clock for the new Philadelphia City Buildings is to be worthy of that magnificent structure. The centre of the dial (25 ft. in diameter) will be 351 ft. above the street. It is anticipated that it will take a year to place the clock machinery in the tower after the building has been completed. The bell is to weigh between 20,000 lbs. and 25,000 lbs., and will be second in weight to the Great Montreal Cathedral bell, which weighs 28,000 lbs., and it is expected that its peal will be heard even to the most distant part of the city. Chimes similar to those of Westminster clock will be used, ringing at the quarter, half, three-quarter, and hour. To distinguish the time at night the dial will be illuminated by electricity, so that the position of the hands can be seen from any point of the city. The minute hand is to be 12 ft. and the hour hand 9 ft. in length, while the Roman figures on the dial will measure 2 ft. 8 in. in length. A steam-engine will be placed in the tower for the purpose of winding up this most wonderful timepiece each day."

THE TELEPHONE IN SWEDEN.—On March 31 last the cost of the Swedish state telephone net amounted to 132,000*l.* The length of the same was 7,625 miles, with 5,700 apparatus. In 1888 the telephone net was about half of its present length.

BUILDING BY-LAWS AT CARDIFF.—A special meeting of the Public Works Committee of the Cardiff Corporation was held at the Town-hall, on the 21st inst., for the purpose of considering the new by-laws for the control of building operations in the town and other works of public or private improvements. Alderman D. Lewis presided. With the exception of one or two suggested alterations, which were ordered to be printed, it was resolved that the by-laws be adopted subject to the approval of the Local Government Board.—*Western Mail.*

CAPITAL AND LABOUR.

THE LOCK-OUT OF CARPENTERS AND JOINERS IN LONDON.—In accordance with the terms of the ultimatum of the Central Association of Master Builders, the terms of whose notice expired on Saturday, upwards of sixty firms have closed their shops and jobs to the carpenters and joiners in the London district. These firms no doubt include most of the principal London master builders, who have almost without exception closed their shops and jobs against carpenters and joiners. It is stated on the masters' side that upwards of 5,000 men are directly affected by the lock-out. These firms are still carrying on those works where carpenters and joiners can at present be dispensed with, but in the event of the struggle continuing it must necessarily involve the enforced idleness of the other trades, which would probably increase the number of unemployed ten-fold. The figures given do not by any means approach the number who are indirectly affected. The week before the lock-out began many hundreds of workmen were discharged, and we hear of numerous jobs which by this time would have been started, but which are now abandoned or postponed. The operatives, on the other hand, do not admit that so many men as the masters say are affected by the lock-out, and

they express themselves as confident of carrying their demands,—a forty-seven hours' week, and an increase of wages from 9d. to 10d. per hour. The Executive of the United Trades' Committee of Carpenters and Joiners met on Wednesday evening at Agar-street to discuss the present outlook, and arrange for the distribution of the week's strike pay. The contracts of firms struck against are still left unfinished, and the masters, it was stated, had not yet succeeded in procuring the services of new men to fill the vacancies caused by the strikers. Delegates are about to visit some of the large industrial centres during the next few days in order to promote the interests of the amalgamated societies. Arrangements have already been made for holding meetings of workmen in Coventry, Ashton-under-Lyne, Manchester, Birkenhead, and Liverpool. The branch organisations in the districts of Richmond and Forest-hill have voluntarily imposed a weekly levy in aid of the locked-out men.

IPSWICH BRICKLAYERS. — The bricklayers of Ipswich are desirous of obtaining a halfpenny per hour increase of wages, and very shortly the demand will be laid before the employers. Last week the Eastern Counties Labour Federation called a meeting of the bricklayers, which was held in the Co-operative Hall, to hear the opinion of men who do not belong to the Bricklayers' Society as to their feeling on the subject. The members of the society are unanimously in favour of the demand. Mr. Joseph Robinson (Secretary of the Eastern Counties Labour Federation) was voted to the chair, and there were about 100 present. The non-society men agreed to join the society, and to co-operate with the existing society men in the attainment of their object.

MEETINGS.

SATURDAY, MAY 30.

Artists' Benevolent Fund. — Anniversary Dinner, Freemasons' Hall. 7 p.m.

St. Paul's Ecclesiological Society.—Visit to Shenfield and Hutton, under the guidance of Mr. F. Chancellor, F.R.I.B.A. Train leaves Liverpool-street at 2.45 p.m.

Royal Institution.—Professor A. H. Church, M.A., F.R.S., on "The Scientific Study of Decorative Colour." I. 3 p.m.

Edinburgh Architectural Association.—Annual Excursion, Kinross House, Tullibole Castle, Aldie Castle, Cleish Castle, and Dowhill Castle.

MONDAY, JUNE 1.

Royal Institution. — General Monthly Meeting. 5 p.m.

Society of Engineers.—Mr. John Kerr on "Portable and Pioneer Railways." 7.30 p.m.

Clerks of Works' Association (Carpenters' Hall).—Monthly Meeting. 8 p.m.

TUESDAY, JUNE 2.

Royal Institution.—Dr. Charles Waldstein on "The Discovery of the Tomb of Aristotle." 9 p.m.

Society of Biblical Archæology.—8 p.m.

WEDNESDAY, JUNE 3.

British Archæological Association. — 1. Mr. H. Syer Cumings, F.S.A. Scot., on "Vessels of Samian Ware." 2. Mr. A. Canham on "The Archæology of Crowland." 3. The Rev. Cave-Browne on "Penenesden Heath." 8 p.m.

THURSDAY, JUNE 4.

Royal Archæological Institute.—1. Mr. E. Peacock on "Mortars." 2. Mr. J. L. André on "Symbolic Animals in English Art and Literature." 3. Rev. W. Miles Barnes on "Thirteenth-Century Glass in Bradford Peverell Church, Dorset." 4 p.m.

Society for the Encouragement of the Fine Arts.—Third Conversazione, at the Galleries of the Royal Institute of Painters in Water Colours, Piccadilly.

Society of Antiquaries.—8.30 p.m.

SATURDAY, JUNE 6.

Royal Institution.—Professor A. H. Church, M.A., F.R.S., on "The Scientific Study of Decorative Colour." II. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

6,089.—DISCHARGE APPARATUS FOR CISTERNS, &c.: *J. Eckersley and others.*—According to this invention, a weighted lid or disc closes by its own weight the upper end of the vertical outlet aperture through which the water is discharged. The weighted valve, lid, or disc, hangs by a chain from the inner arm of the ordinary pull-down lever, and immediately above the disc is an elongated slotted link, which, when the disc is raised,—by the lever being pushed over on to a projecting horizontal arm, by the pressure of a finger on a supplementary float-ball lever, and being also pushed off again when the water level has fallen below a given point,—causes the disc to drop and close the outlet.

7,215.—FOUNDATIONS FOR LIGHT BUILDINGS: *D. Allport.*—This invention consists of an iron collar in combination with a post or rail. The collar is formed by a plate strengthened by ribs with a hole through the plate enabling it to be passed over the post when the latter has been driven home to the proper level. The collar is made with upright flanges projecting beyond the top of the post to embrace the sill of the building to which it may be secured by screws, bolts, or spikes.

8,682.—CHIMNEY-TOPS: *G. Calvert.*—The passage of the flue is contracted or gathered in the form of a bell or cone, by inserting a bell tube with fluted grooves. Round the sides of the chimney-pot holes are cut to admit currents of air to draw the smoke upward, and divert any down draught or moisture. The hole in the top of the bell tube is sufficiently large to allow a sweep's brush to pass.

8,711.—RAIN-WATER PIPES: *J. B. Millar.*—This invention relates to the construction of pipes formed with segmental projections at their faucet and spigot-jointing ends, secured together by removable "ear" or annular coupling bands. By this invention any intermediate or individual pipe of a set can be removed or replaced without disturbing the others.

9,440.—HINGES: *H. Schlund.*—The strip or blank for the hinges is formed as a long strip, flat and straight, with a central ridge on one face of the metal. It is rolled or pressed, and a wire inserted; then the hinge is formed by universal collapsing dies, or such-like means, and the strip is afterwards cut into proper lengths for hinges.

464.—FASTENINGS FOR CASTORS, DOOR-KNOBS, &C.: *J. Thinnes.*—The fastening which is the subject of this patent combines in its structure a rod having at one end an enlarged angular head, and at its other end a screw-thread, a nut, and a tubular sleeve. Each angle of the head of the rod has a seat in the recess between the sections of the sleeve to prevent the rod turning when drawn within the sleeve.

2,457.—ROOFING MATERIAL: *J. N. Hopper.*—The material which is used by the inventor consists of a layer of woven wire or reticulated material, having its interstices or meshes closed with a plastic mass combined with a second layer of fabric saturated with a similar filling material, and incorporated with or adhering to the woven wire layer.

4,672.—STUCCO: *E. Olson.*—According to this inventor, a compound decoction of hickory bark, tar, and gum is used to mix with the stucco and sand. It sets and hardens very quickly, and finishes smoothly. It may be coloured by mixing pigments with the compound.

NEW APPLICATIONS FOR PATENTS.

May 11.—8,043, A. Schadler, Window Sash-fastener, &c.—8,065, C. Pond, Paint Brushes.

May 12.—8,133, T. Rogers, Water-closets.—8,138, A. Bayley, Tip Waggons.—8,140, A. Boult, Carving Machines.—8,147, W. Thompson, Drains for Buildings, &c.—8,161, H. Lake, Manufacture of White Lead.

May 13.—8,202, P. Nessi, Lamps or Hand Stoves for burning off paint.—8,208, R. Pickford, Gas-light Ventilator and Reflector.—8,233, G. Bischoff, Cowls and Ventilators.—8,234, E. Davis and T. Baldwin, Joint for Coupling Pipes, &c.

May 14.—8,281, E. Ingrey, Sash-fastener.—8,282, W. Wilkinson and J. Miles, Removal of Paint, Varnishes, &c., from Surfaces.—8,287, J. Hodgson and E. Sheard, Coating the Surfaces of Walls and Buildings with Sand or other similar Material.—8,296, A. McLean, Transparent Coloured Material for Decorative Purposes.—8,300, C. Alldred, Jointing of Stoneware Pipes.—8,311, G. Chambers and others, Manufacture of White-lead.—8,324, W. Smith and J. Claydon, Sash-fasteners.—8,325, A. Tanes, Window Sash-fasteners.—8,327, E. Tilley, Window Sash-fasteners.

May 15.—8,391, J. Walker, Window-sash Fasteners.—8,406, W. Horn, Spirit-level, Plumb, and Clinometer.—8,414, P. Kraus, Construction of Watertight and Fireproof Pipes, Roofings, Walls, and Linings.—8,416, J. Fryer, Ventilating Cowl.

May 16.—8,425, J. Hartley, Fixing Joiners' Work in Houses and other Buildings.—8,461, W. Hayhurst, Joiners' Cramps.—8,462, B. Goldmann, Manufacture of Paints, Oils, and Pully Oils.

PROVISIONAL SPECIFICATIONS ACCEPTED.

5,890, W. Trousdale and J. Thompson, Bolts for Lavatory and other Doors.—6,778, U. Sipos, Stove.—6,839, J. Fairbank, Gas-fittings.—6,922, A. Damp, Water-closet Cisterns.—6,924, E. Bilton, Glazing Pottery, &c.—7,145, W. Allen, Automatic Basin of any required section with revolving action for Flushing Water-closets.—7,359, J. Merrill, Syphon Flushing Cisterns.—7,411, W. Mackinnon, Chimney Cowl.—7,510, R. Marshall and E. Fitzgerald, Air Propelling or Ventilating.—7,534, J. Williams, Glazing.—7,727, D. and F. Platt, Die or Dies for use in making Divideable Tiles.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

10 980, J. Ratcliffe, Earthenware and other Pipes.—11,279, Gibbons, Hinton, & Co., Ornamental Tiles. &c.—5,590, F. Kelsey, Spring Hinges.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

MAY 11.—By *T. G. Wharton* (at Crayford): Five plots of f. building land, Dartford Heath-rd., Crayford, 279*l.*

MAY 19.—By *Chinnock, Galsworthy, & Co.:* Nos. 64, 66, and 68, New Oxford-st., u.t. 34 yrs., g.r. 115*l.*, r. 462*l.*, 4,660*l.*—By *F. J. Bisley:* 16, Monnow-rd., Bermondsey, u.t. 51 yrs., g.r. 5*l.* 12s. 6d., r. 39*l.*, 400*l.*; 12, 14, 16, and 18, Litlington-st., Rotherhithe, u.t. 51 yrs., g.r. 18*l.*, r. 96*l.* 4s., 510*l.*—By *M. Liell:* 5 and 6, Charles-st., Poplar, u.t. 59 yrs., g.r. 6*l.* 10s., r. 46*l.* 16s., 255*l.*; 93, Crisp-st., u.t. 55 yrs., g.r. 8*l.*, r. 45*l.*, 455*l.*; 121, Grundy-st., f., r. 19*l.* 10s., 135*l.*; 149, Brunswick-rd., Bromley, E., u.t. 47 yrs., g.r. 3*l.* 10s., r. 27*l.* 6s., 195*l.*; 3, 6, 7, and 8, Railway-st., f., 93*l.* 12s., 1,095*l.*; 3, 5, and 7, Byron-st., f., r. 74*l* 2s., 765*l.*

MAY 20.—By *Phillips, Lea, & Davies:* 133, King's-cross-rd., King's-cross, f., r. 60*l.*, 1,200*l.*; 94 and 96, St. John's-rd., and 3 and 5, Ivy-st., Hoxton, u.t. 12 yrs., g.r. 10*l.*, r. 163*l.* 8s., 380*l.*

MAY 21.—By *Daniel Watney & Sons:* "Ashley Green Farm," Chesham, Bucks, containing 114a. 2r. 11p., f., 2,820*l.*; "Nashleigh Farm," containing 92a. 3r. 26p., f., 2,370*l.*; two enclosures of land, containing 12a. 3r. 7p., f., 530*l.*; a plot of f. building land, Mansfield-rd., Croydon, 340*l.*; a plot of f. building land, Newark-rd., 340*l.*; three plots of f. land, Sussex-rd., 1,010*l.*—By *G. Brinsley:* 20, Crystal Palace-rd., East Dulwich, u.t. 76 yrs., g.r. 4*l.* 4s., r. 26*l.*, 200*l.*; 37, Noel-st., Islington, f., r. 42*l.*, 525*l.*; 6, Idmiston-st., Stratford, f., 210*l.*—By *John Bussey:* 62 and 64, Glengall-rd., Poplar, u.t. 50 yrs., g.r. 6*l.* 8s, r. 46*l.* 16s., 215*l.*—By *Jenkins & Sons:* 31, 33, and 35, Kingsland-rd., Kingsland, u.t. 10 yrs., g.r. 22*l.* 10s., 425*l.*; 28 and 30, Regency-st., and 56, Vincent-st., Westminster, u.t. 13 yrs., g.r. 1*l.* 13s. 4d., r. 100*l.*, 305*l.*—By *Maddox & Son:* No. 69, Maida Vale, u.t. 81 yrs., g.r. 17*l.*, 1,200*l.*—By *Newbon & Co.:* "The Fox" beer-house, West-street, Mile End, f., r. 42*l.*, 600*l.*; 32 and 34, Cowper-rd., Stoke Newington, f., r. 53*l.*, 725*l.*; 9 and 11, North-rd., Clapham, u.t. 50 yrs., g.r. 16*l.*, 1,015*l.*; 7, River-st, Pentonville, u.t. 2 yrs., g.r. 85*l.*, r. 140*l.*, 40*l.*; 48 to 62 (even), Kingslake-st., Old Kent-rd., u.t. 16 yrs., g.r. 43*l.*, r. 122*l.* 11s., 100*l.*; 1 to 12, St. Dunstan's-st., Forest-gate, u.t. 89 yrs., g.r. 42*l.*, r. 249*l.* 12s., 1,120*l.*; 3, 4, 5, and 6, Lyndhurst-villas, u.t. 89 yrs., g.r. 24*l.*, r. 109*l.* 4s., 535*l.*; an enclosure of land, Edmonton, 2a. 2r. 17p., f., 800*l.*; f.g.r. of 14*l.* 8s., with reversion in 30 yrs., Waterloo-rd., Lambeth, 440*l.*; 21, 23, and 25, Spurstowe-rd., Hackney, u.t. 83 yrs., g.r. 18*l.*, r. 111*l.* 12s., 650*l.*

MAY 21.—*Rutley, Son, & Vine:* 14, Argyle-st., King's-cross, u.t. 49 yrs., g.r. 13*l.* 15s., r. 50*l.*, 375*l.*; 50, Baring-st., Hoxton, u.t. 41 yrs., g.r. 4*l.* 4s., r. 28*l.*, 225*l.*; 51, Baring-st., u.t. 41 yrs., g.r. 4*l.* 4s., r. 28*l.*, 225*l.*; 56 and 58, Marlborough-st., Paddington, 454 yrs., g.r. 12*l.*, r. 66*l.*, 635*l.*; 37, Tachbrook-st., Pimlico, u.t. 29 yrs., g.r. 9*l.*, r. 50*l.*, 300*l.*; a plot of f. land, Hall-rd., Peckham, 46*l.*—By *H. J. Bromley:* 1, 3, 5, and 7, Woodcote-pl., West Norwood, f., r. 78*l.*, 850*l*; 12, 14, and 16, Ernest-st., and a plot of land in rear, f., 860*l.*; 101 and 103, High-st., u.t. 31 yrs., g.r. 8*l.*, r. 40*l.*, 270*l.*

MAY 22.—By *E. Christian*: 27, 29, and 31, Carlton-rd., Mile End, u.t. 35 yrs., g.r. 9*l.*, r. 72*l.*, 785*l.*—By *Baker & Sons*: 50 and 54, Radipole-rd., Fulham, u.t. 87 yrs., g.r. 16*l.*, 700*l.*—By *Graves & Son*: 155 and 157, Church-st., Paddington, u.t. 43 yrs., g.r. 25*l.*, r. 76*l.* 10s., 540*l.*; 30 and 40, Spring-st., u.t. 30 yrs., g.r. 19*l.*, r. 185*l.*, 1,075.—By *C. & H. White*: 6, Milverton-st., Kennington, u.t. 40 yrs., g.r. 4*l.* 15s., 265*l.*—By *Newbon & Co.*: 36, Bowling Green-lane, Clerkenwell, u.t. 34 yrs., g.r. 6*l.*, 205*l.*; 111, Asylum-rd., Peckham, u.t. 65 yrs., g.r. 6*l.* 1s. 9d., r. 26*l.*, 210*l.*; Three plots of f. land, Thornhill-rd., Leyton, 255*l.*; 19, High-st., Hornsey, u.t. 87 yrs., g.r. 19*l.*, 245*l.*; 87, Andover-rd., Holloway, u.t. 52 yrs., g.r. 5*l.*, 195*l.*; 71, Marquess-rd., Canonbury, u.t. 54 yrs., g.r. 10*l.*, 550*l.*; 84 to 92 (even), Cochrane-st., St. John's Wood, u.t. 29 yrs., g.r. 26*l.* 5s., r. 150*l.* 10s., 1,440*l.*; 82, St. John's Wood-ter., u.t. 44 yrs., g.r. 5*l.*, r. 44*l.*, 445*l.*; 11 & 15, Charles-st., u.t. 37 yrs., g.r. 12*l.*, r. 72*l.*, 630.; 40, Barnsbury-grove, Barnsbury, f., r. 30*l.*, 390*l.*; 1, Offord-rd., u.t. 47 yrs., g.r. 9*l.*, r. 50*l.*, 385*l.*; 11, Mary-st., Hoxton, u.t. 36 yrs., g.r. 3*l.* 3s., r. 26*l.*, 190*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.			TIMBER (*continued*).		
Greenheart, B.G. ton	8/0/0	9/0/0	Satin, St. Domingo .....ft.	0/0/10	0/1/3
Teak, E.I... load	8/10/0	14/0/0	Porto Rico	0/0/10	0/1/6
Sequoia, U.S.ft.cu.	2/3	3/0	Walnut, Italian..	0/0/3½	0/0/7
Ash, Canada load	2/10/0	4/5/0	METALS.		
Birch, do.	2/5/0	4/5/0	IRON—Bar, Welsh, in London..ton	6/5/0	6/15/0
Elm, do.	3/10/0	4/15/0	Do. do. at works in Wales	5/15/0	6/5/0
Fir, Dantsic, &c.	2/0/0	3/15/0	Do. Staffordshire, in London	6/5/0	7/0/0
Oak, do.	2/10/0	4/10/0	COPPER—British, cake and ingot	56/0/0	57/0/0
Canada.....	4/17/6	6/10/0	Best selected ..	59/0/0	60/0/0
Pine, Canada red	2/10/0	3/10/0	Sheets, strong..	68/0/0	0/0/0
Do, yellow	2/0/0	5/10/0	Chili, bars	52/10/0	0/0/0
Lath, D'ntsic, fath	5/0/0	6/0/0	YELLOW METAL lb.	0/0/6	0/0/6½
St. Petersburg	5/0/0	7/0/0	LEAD — Pig, Spanish....ton	12/7/6	12/8/9
Deals, Finland, 2nd & 1st std 100	7/15/0	10/10/0	English, com. brands	12/12/6	12/15/0
Do, 4th & 3rd..	7/5/0	8/5/0	Sheet, English, 3 lbs. per sq. ft. and upwards ..	14/5/0	0/0/0
Do. Riga	6/5/0	7/15/0	Pipe	14/15/0	0/0/0
St. Petersburg, 1st yellow ..	9/15/0	14/10/0	ZINC—English sheet .....ton	26/5/0	0/0/0
Do. 2nd yellow	8/5/0	9/5/0	Vieille Montagne.....	26/15/0	0/0/0
Do. white	6/15/0	10/10/0	TIN—Straits	90/10/0	0/0/0
Swedish	6/15/0	15/15/0	Australian	90/15/0	0/0/0
White Sea	8/5/0	17/5/0	English Ingots	94/10/0	0/0/0
Canada, Pine 1st	13/0/0	24/0/0	OILS.		
Do. do. 2nd....	9/0/0	15/10/0	Linseed .....ton	22/5/0	22/10/0
Do. do. 3rd, &c.	6/10/0	10/0/0	Cocoanut, Cochin	35/0/0	0/0/0
Do. Spruce. 1st	8/15/0	11/0/0	Do. Ceylon	29/10/0	0/0/0
Do. do. 3rd & 2nd.....	6/5/0	7/15/0	Palm, Lagos	26/0/0	0/0/0
New Brunswick	5/5/0	7/5/0	Rapeseed, English pale	31/0/0	0/0/0
Battens, all kinds	3/10/0	15/10/0	Do. brown	29/5/0	29/10/0
Flooring Boards, sq., 1 in. prep. 1st	0/10/0	0/14/0	Cottonseed ref...	21/10/0	22/0/0
Do. 2nd.....	0/9/0	0/10/6	Oleine	21/15/0	24/0/0
Other qualities	0/5/0	0/7/6	Lubricating, U.S.	6/0/0	7/0/0
Cedar, Cuba ..ft.	/4	/4½	Do. refined	7/10/0	12/0/0
Honduras, &c.	/4	/4½	TAR—Stockholm barrel	1/0/0	0/0/0
Mahogany, Cuba.	/4½	/6½	Archangel	0/13/6	0/0/0
St. Domingo, cargo av	/4½	/6½			
Mexican do. do	/4½	/5½			
Tobasco do. do	/5½	/7			
Honduras do..	/5½	/6½			
Box, Turkey ton	4/0/0	13/0/0			
Rose, Rio.....	10/0/0	20/0/0			
Bahia	9/0/0	18/0/0			

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BAILDON (Yorks).—For the construction of a storage reservoir in Micklethwaite-with-Bingley, for the Local Board. Mr. B. Walker, Engineer, The Exchange, Bradford, Yorks. Quantities by Engineer:—

J. & T. Young, Armley, Leeds*	£12,920 10 0

* Accepted on reduced quantities.

BEXHILL-ON-SEA (Sussex).—For the erection of small villa residence, Buckhurst-road, Bexhill, for Mr. H. P. Hutchings. Mr. Julian Downsborough, architect, Bexhill-on-Sea. Quantities by the architect:—

S. Barker	£780 0 0	Hy. Parker	£684 0 0
P. Jenkins	775 0 0	Johnson & Co.	637 0 0
W. Austin	751 1 9	Hy. T. Squirrell, Bexhill-on-Sea (accepted)	623 0 0
J. King	729 0 0		
C. Errey	690 0 0		

EALING.—For alterations and additions, new billiard-room, &c., the "Queen Victoria" Hotel, Ealing-green, for Mr. Sidney J. Street. Mr. Walter Mitchell, architect:—

Spencer & Co.	£1,620	T. Nye, Ealing*	£1,498
J. Vears & Co.	1,557		

* Accepted.

FENTON (Staffs.)—For detached house, Blurton-road, Fenton, for Mr. P. Wagstaffe. Mr. Thos. Tindal, architect, Longton:—

H. & R. Inskip	£893 0	Thos. Bromage	£708 0
Minks	855 0	Tompkinson & Bettelley, Longton (accepted)	700 0
P. H. Bennion	739 0		
H. Goodwin	736 16		

FOREST GATE.—For constructing proposed swimming-baths at Woodgrange House, Forest Gate, for Mr. Francis Craddock. Mr C. J. C. Pawley, architect, 2, Prince's-mansions, Victoria-street S.W.:—

J. Mansbridge	£3,050	Everitt & Co.	£2,900
W. Goodwin	2,999	Turtle & Appleton	2,800

FREEMANTLE.—For the erection of mission-hall, for the Rector and Churchwardens of Christ Church, Freemantle. Mr. Sydney K. Pope, architect, 27, Portland-street, Southampton:—

J. Crook & Son	£315 0	T. J. Jukes, Park-road, Freemantle (accepted)	£305
A. Warden	312 0		

HASTINGS.—For erecting new workhouse, St. Helen's Down, Hastings, for the Board of Guardians. Mr. Philip H. Tree, architect, St. Leonards-on-Sea. Quantities supplied :—

T. Simmonds	£99,891	H. Stiffe	£85,798
Reed, Blight, & Co.	99,550	Longley & Son	84,985
F. & H. Higgs	99,000	Morgan, Isted, & Co.	83 986
S. & W. Pattinson	97,455	W. & F. Denne	83,750
Martin, Wells, & Co.	94,000	F. Cruttenden	82,780
P. Peters	89,000	T. Salter	82,500
W. Martin	88,700	Wallis & Sons	82,250
H. L. Holloway	88,000	Taylor Bros.	81,000
Kirk & Randle	86,985	P. Jenkins	79,500
W. J. Adcock	86,777	Holloway Bros.	79,041
Patman & Fotheringham.	86,500	Eldridge & Cruttenden	78,850
Denne & Son	85,940	Architect's estimate, £85,000.	

HAYNFORD (Norfolk).—For alterations and repairs to Haynford Hall, near Norwich, for Admiral E. Pollard. Messrs. Ayres & Ardron, architects, 8, Southampton-street, Bloomsbury-square, W.C. :—

Watts	£1,263	Baldwin, Horstead	£880
Chapman	1,211		

* Accepted, subject to reductions.

HEREFORD.—For the construction of pipe-sewers, with manholes, &c., for the Town Council. Mr. John Parker, City Surveyor, Mansion-house, Hereford :—
John Mackay, Hereford (accepted at a schedule of prices).

KIRKCALDY, N.B.—For additional waterworks at Harperlees, near Leslie, for the Kirkcaldy and Dysart Water Commissioners, Mr. W. D. Sang, Engineer, Kirkcaldy, N.B. :—

John Morris & Sons	£1,700 16 1½ !	John Kennedy	£1,186 18 6
R. C. Brebner	1,305 13 3	Alex. Brunton & Son, Inverkeithing (accepted)	972 3 6½
David Whyte	1,295 19 4½		
William Wilson	1,263 0 9		
George Smith	1,221 6 0½	L. & W. McDonald	906 16 3¼ !

LEEK.—For sewering, excavating, levelling, metalling, kerbing, flagging, &c., Belle Vue-road, Leek, for the Town Commissioners, Mr. John Myatt, Town Surveyor :—

Fred. Barke	£798	Thos. Grace, Leek (accepted)	£620

LINCOLN.—For the erection of stable and cart shed, Pelham-street, for Messrs. Arnold & Co. Mr. J. H. Cooper, architect, Lincoln :—

Wright & Sons	£195 0 0	H. S. & W. Close	£184 0 0
S. Horton	193 7 6	M. Otter & Co.	179 0 0
J. B. Harrison	191 13 0	J. W. Harrison*	157 0 0
C. Morgan	185 0 0		

* Accepted.

LINCOLN.—For additions and alterations to branch premises (exclusive of iron girders), at Metheringham, for the Lincoln Co-operative Society. Mr. J. H. Cooper, architect Lincoln :—

M. Broughton	£267 0 0	M. Otter & Co.	£220 0 0
T. Halkes	247 15 6	J. W. Harrison*	210 0 0

* Accepted.

LONDON.—For alterations and additions to the "Red Lion" public-house, Hoxton, for Mr. E. J. Arpthorp. Mr. E. E. Niblett, architect, 11, Union-chambers, Wormwood-street, E.C. :—

Walker Bros.	£2,226	Burman & Son	£2,060
Courtney & Fairbairn	2,180	G. E. Todd (accepted)	2,010
W. & L. Ransom	2,095	W. Evans	2,000

LONDON.—For alterations and additions to the "Rose and Crown" public-house, Southwark Park-road, S.E., for Mr. Morris Hart. Mr. E. E. Niblett, architect, 11, Union-chambers, Wormwood-street, E.C. :—

W. Higgs	£1,595	Courtney & Fairbairn	£1,513
W. Evans	1,585	Turtle & Appleton*	1,384
Walker Bros.	1,580		

* Accepted.

LONDON.—For painting and repairs at the Infirmary, Ratne-street, Old Gravel-lane, E., for the Guardians of St. George-in-the-East. Messrs. Wilson, Son, & Aldwinckle, architects, 2, East India-avenue, Leadenhall-street, E.C. Quantities supplied :—

Turtle & Appleton	£920 0 0	J. Holland	£693 0 0
C. Willson	844 0 0	G. E. Todd (accepted)	636 0 0
Staines & Son	796 0 0	M. McCarthy	633 17 9
G. Barker	795 0 0		

LONDON.—For painting, decorating, &c., at the Infirmary Wing, St. Pancras, for the Guardians :—

Pockett	£489 0	Furness	£235 0
White & Son	345 10	Derby	197 0
Nye	276 0	Lane	195 0
Marchant	249 0	Rowe Bros.	160 0

LONDON.—For alterations at the "Two Brewers," Westminster, for Mr. Walters. Mr. H. W. Budd, surveyor, 76, Vincent square, S.W. :—

Prestige & Co.	£490	Charteris	£400
Turtle & Appleton	478	Masters*	397
Lamble	435		

* Accepted.

LONDON.—Accepted for fittings and alterations to No. 75, Fleet-street, E.C., for Messrs. Lockharts, under the superintendence of Mr. Henry Cook :—
Fredk. Britton, Leconfield Works, Highbury, N. £653 18 6

LONDON.—For the repair, cleansing, and painting of the following schools, for the West Ham School Board. Messrs. J. T. Newman & Jacques, 2, Fen-court, E.C., Architects to the Board :—

Colegrave-road Schools.

Sharpe	£395	Norton & Son	£303
North	339	Reed	299
Morter	310	Catley (accepted)	280

Custom House Schools.

Goodchild	£242	Whitty	£225
Morter	240	Humphreys*	208
Maddison	231		

* Accepted.

High-street Schools.

Allen & Clemenson	£190	Whitty	£152
Norton & Son	189	Bishop & Webb	151
Reed	185	Humphreys (accepted)	108

Maryland Point Schools.

Sharpe	£505	Norton & Son	£295
Catley	310	Morter	294
Hosking	297	Reed (accepted)	289

Regent's-lane Schools.

Hearle, Farrow, & Co.	£394	Key	£260
Bishop & Webb	384	Noakes*	245
Maddison	359		

* Accepted.

Cleansing Latrines at Schools.

Bishop & Webb	£169	Noakes	£120
Maddison	151	North Bros.*	104
Hosking	123		

* Accepted.

LONDON.—For the erection of new quarters for married police officers, at South Fulham Police-station, for the Receiver for the Metropolitan Police District. Mr. John Butler, F.R.I.B.A., Architect. Quantities by Mr. W. H. Thurgood :—

Hart Bros.	£3,536	Stimpson & Co.	£3,160
Grover & Son	3,313	Scrivener & Co.	3,100
J. T. Chappell	3,310	C. Ansell	3,090
Garlick & Horton	3,300	W. E. Nightingale	3,073
J. Smith & Son	3,297	H. Smith & Son (withdrawn owing to mistake in cast)	2,695
Lathey Bros.	3,176		

LONDON.—For the demolition of existing courts and cottages, the formation of a new street, and the erection of eleven blocks of tenement houses on the London Hospital Estate, for the Governors. Messrs. J. T. Newman & Jacques, architects, 2, Fen-court, E.C. Quantities by Messrs. R. L. Curtis & Sons :—

Sharpe	£16,900	Sparks	£15,890
Hearle, Farrow, & Co.	16,396	Morter	15,843
Reed	16,190	Harris & Wardrop	15,700
Nightingale	16,270	Perry & Co.	15,595
Holland	16,047	Stimpson & Co.	14,900
Outhwaite & Son	15,980		

LONDON.—For alterations at the "Red Lion," Rotherhithe, for Mr. Karslake. Mr. H. W. Budd, 76, Vincent-square, S.W. :—

Charteris	£410	Smithers*	£335
Prestige & Co.	374	Masters	315

* Accepted at reduced amount.

LONDON.—For the erection of an ink factory, Finsbury Park, N., for Mr. H. C. Stephens, M.P. Messrs. Crickmay & Sons, architects, 17, Parliament-street, Westminster, S.W. :—

Patman & Fotheringham	£26,500	J. Mowlem & Co.	£25,005
Dove Bros.	25,775	Holland & Hannen	24,995
Smith & Co.	25,374	G. H. & A. Bywaters	24,960
Colls & Sons	25,115	E. Lawrance & Sons	23,561

LONDON.—For the erection of mortuary, &c., for the Vestry of Bermondsey. Mr. G. Elkington, architect :—

Orfeur	£690 0	Chalkley	£487 0
Cautley & Fairbairn	559 0	Kingsman	456 17
C. Pennack	521 0	W. F. Russell (accepted)	438 0

LONDON.—For the erection of four houses, Albert-grove, Morpeth-road, Victoria Park, for Mr. Fox. Messrs. T. & W. Stone, architects, Great Winchester-street, London-wall, E.C. :—

Laughton	£1,690 !	G. W. Beale	£1,279
Jarvis & Sons	1,359	Winkley	1,058
F. G. Higgs	1,297	J. Peppiat	880 !
B. Wire	1,268		

LONDON.—For building workshops at rear of 51, Tudor-street, Hackney, E., for Messrs. Spratt Bros. :—

Royal & Co.	£2,290	Thomerson & Son	£1,744
Boyce	2,223	Jarvis & Son	1,420
Mower & Son	2,137		

LONDON.—For alterations, &c., at the "Spread Eagle" public-house, Grosvenor-road, Pimlico, for Mr. J. Bott :—
Mower & Son (accepted) £317 0 0
[No competition.]

LONDON.—For alterations, &c., at the "George" public-house, Commercial-road, for Messrs. Poole & Venner. Mr. R. A. Lewcock, architect, 88, Bishopsgate-street :—

Voller	£2,849	Spencer & Co.	£2,370
Mower & Son	2,497	Harriss & Wardrop	2,333
Todd	2,489	Walker Bros.	2,330

LONDON.—For alterations, &c., to the "Queen's Railway Hotel," Chilworth-street, Paddington, W., for Messrs. Speedy & Co. Mr. H. I. Newton, architect, 49, Victoria-street, Westminster, S.W. :—

Patman & Fotheringham	£2,150	F. Mark	£1,999
S. Godden	2,100	C. Dearing & Son, Islington*	1,750
H. Burman & Sons	2,090		
S. R. Lamble	2,074		

* Accepted.
For Pewterer's Work.
W. Helling, Oxford-street (accepted) £62

LONGTON (Staffs.).—For two semi-detached houses, Rosslyn-road, Longton, for Messrs. Cope & Harber. Mr. Thos. Tindal, architect, Longton :—
P. H. Bennion £879 0 0
H. & R. Inskip, Longton (accepted) 825 0 0

NORTHWOOD (Middlesex).—For the first of three houses, for Mr. George J. Elgood. Mr. Frank M. Elgood, architect, 98, Wimpole-street, W. Quantities by Mr. Ernest S. Gale, Falcon-court, 32, Fleet-street, E.C. :—

Maskins	£856	T. Turner & Co.	£779
Waterman	848	Wm. Thompson, Pinner*	762
McSwinney	845		

*Accepted.

SOUTHEND.—Accepted for fittings and alterations to No. 10, High-street, Southend, Essex, for Messrs. Lockharts, under the superintendence of Mr. Henry Cook :—
Fredk. Britton, Leconfield Works, Highbury, N. £762 5 0

SURBITON.—For painting and repairs at Norbury House, Surbiton, for Miss Forster. Mr. Walter J. Ebbetts, architect, Savoy House, 115, Strand, W.C.
H. Baylis (accepted) £113 10 0

TENTERDEN (Kent).—For alterations to kennels, and erection of two loose-boxes at Heronden Hall, for Mr. Dampier Palmer, J.P. Messrs. J. T. Newman & Jacques, architects, 2, Fen-court, E.C. :—

Weeks & Co.	£187 10	Nunn*	£165 10
Woodgate	181 0		

* Accepted.

WEST HAM.—For main drainage extension works : Contract No. 17. Construction of an engine-house, and alterations to the existing pump-wells, &c., at the Corporation Sewage Works, Canning Town, Bow Creek. Mr. Lewis Angell, M.Inst.C.E., Borough Engineer, Town Hall, Stratford, London, E. :—

J. Neave	£2,979 0 0	W. J. Maddison	£2,155 0 0
A. Ansell	2,349 0 0	B. Cooke & Co.	2,095 4 10
A. Beeton	2,346 0 0	J. Jackson, Plaistow*	2,000 0 0

* Accepted.

WIMBLEDON.—For additions and alterations to the Wimbledon Sanitary Laundry, Cranbrook-road, Worple-road, Wimbledon. Mr. Walter J. Ebbetts, architect, Savoy House, 115, Strand, W.C. :—
H. Harmer (accepted) £774 16 6

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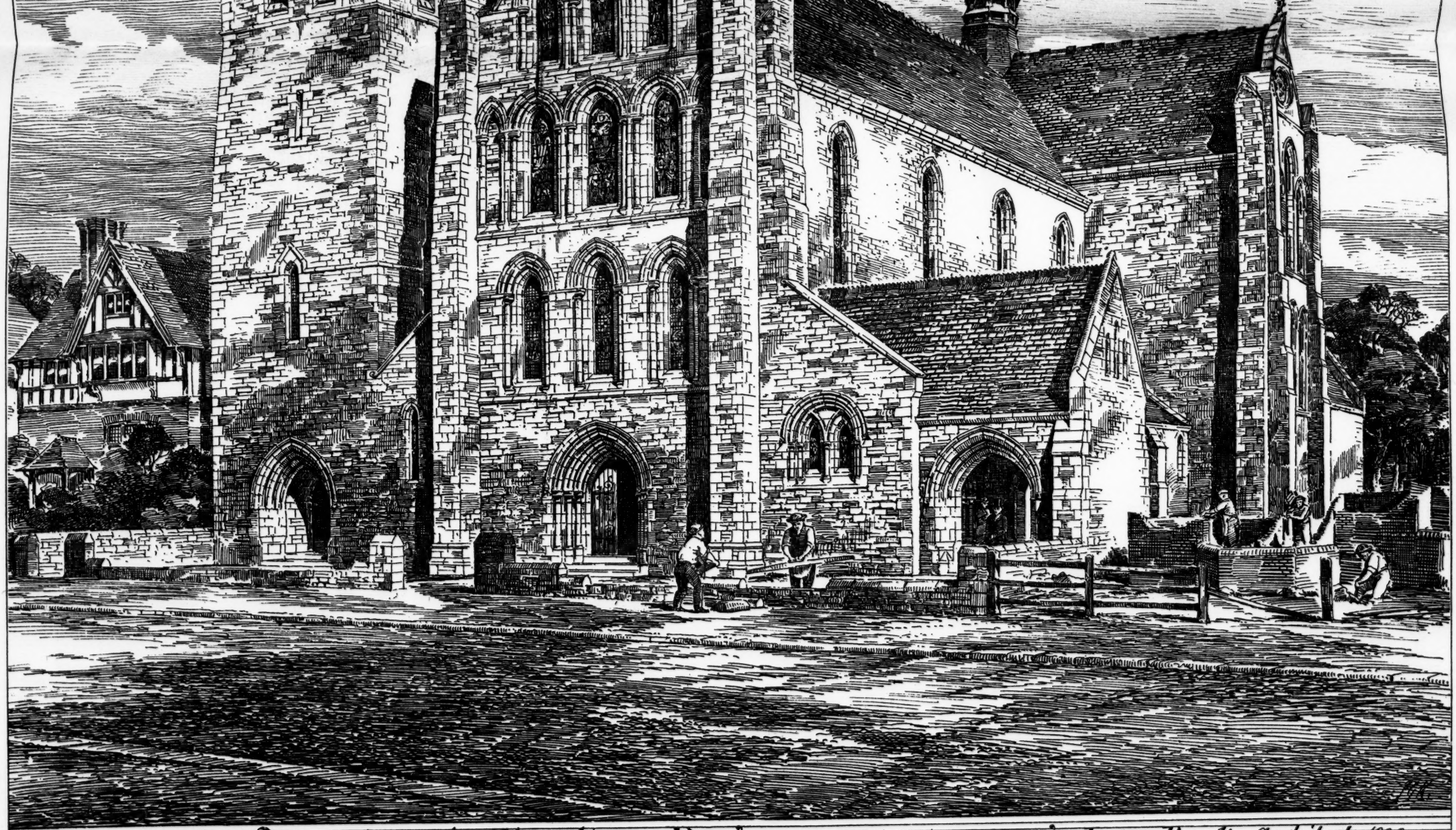

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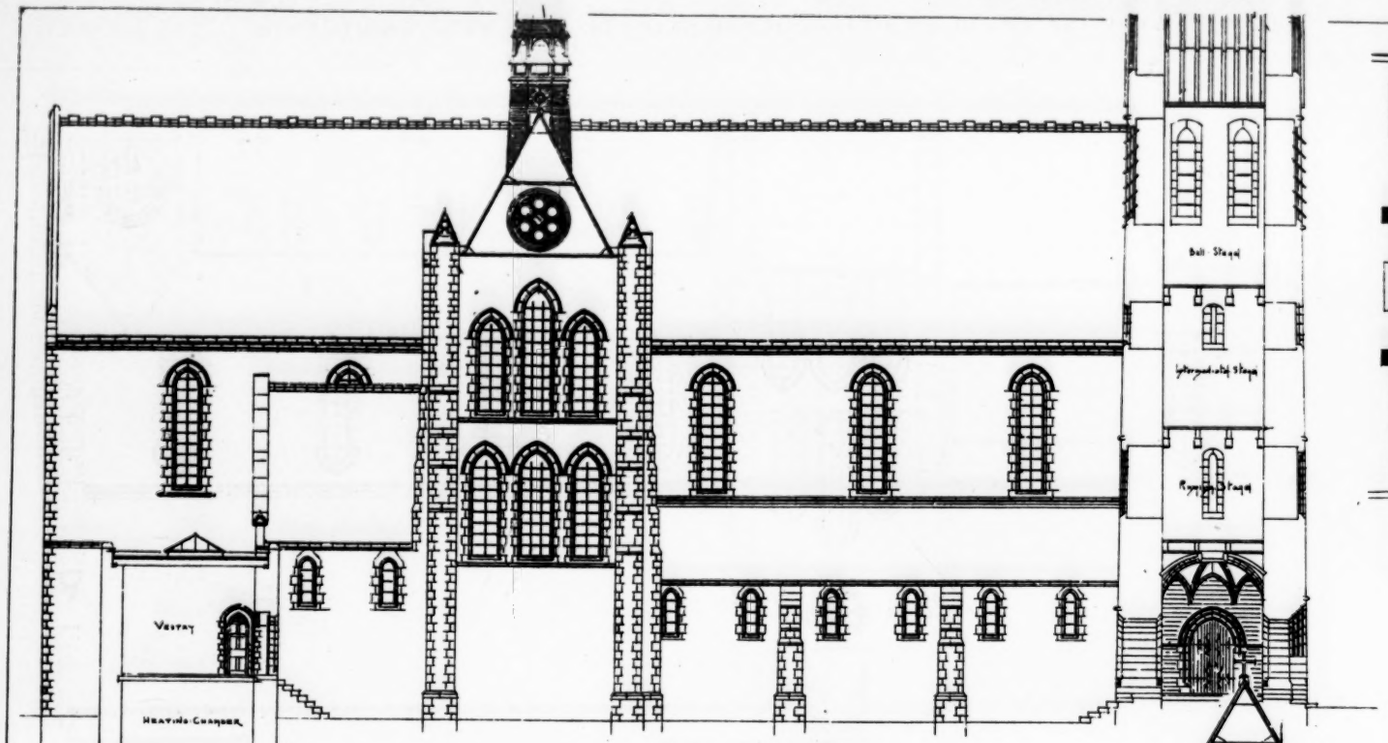

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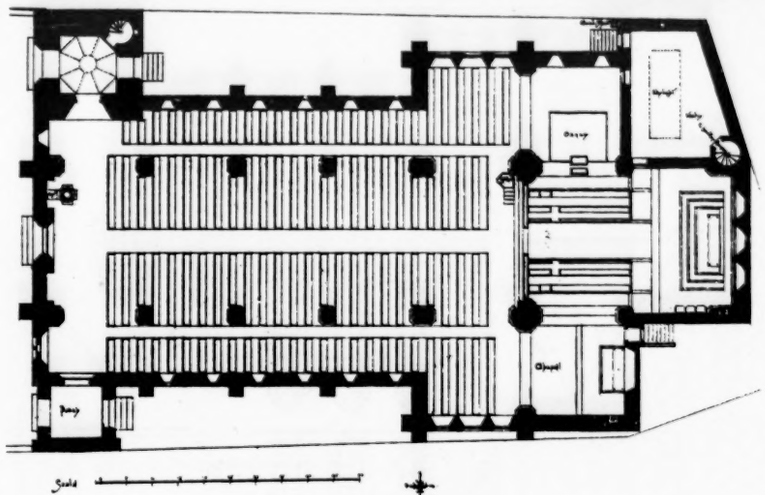

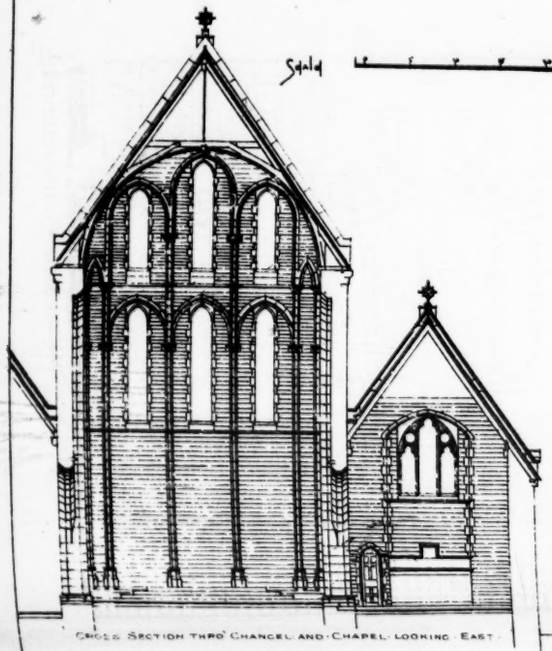

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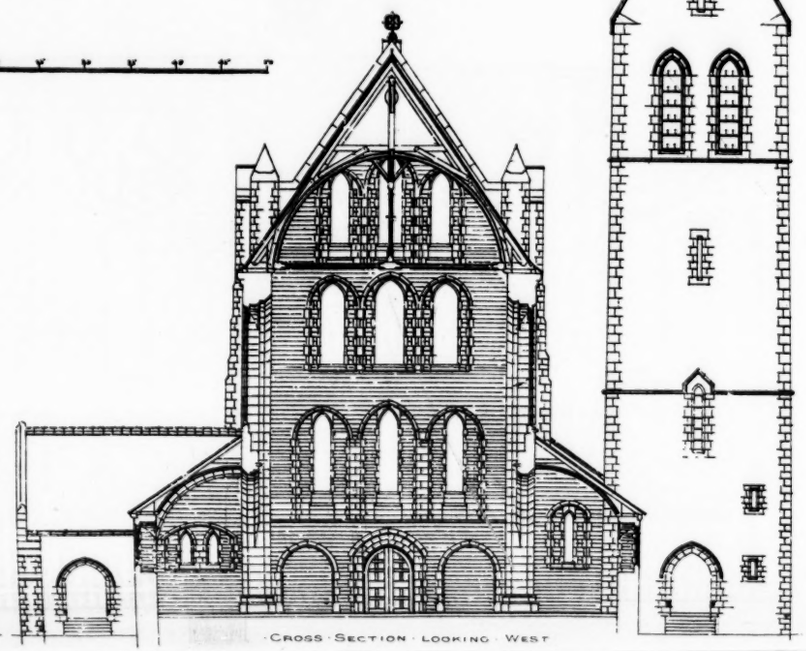

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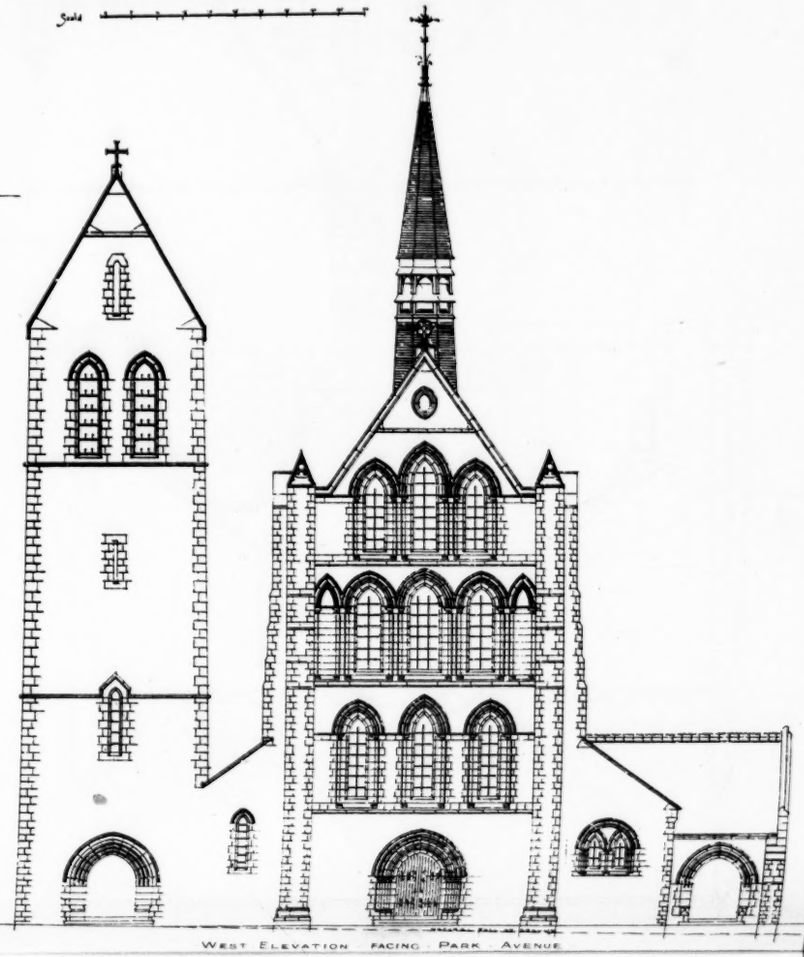

WEST ELEVATION FACING PARK AVENUE

CROSS SECTION THRO' CHANCEL AND CHAPEL LOOKING EAST

CROSS SECTION LOOKING WEST

WEST ELEVATION FACING PARK AVENUE

LONG SECTION LOOKING NORTH

SECTION THRO. NAVE LOOKING EAST

12°3

Scale

SOUTH ELEVATION

EAST ELEVATION

Hearing Chamber Floor

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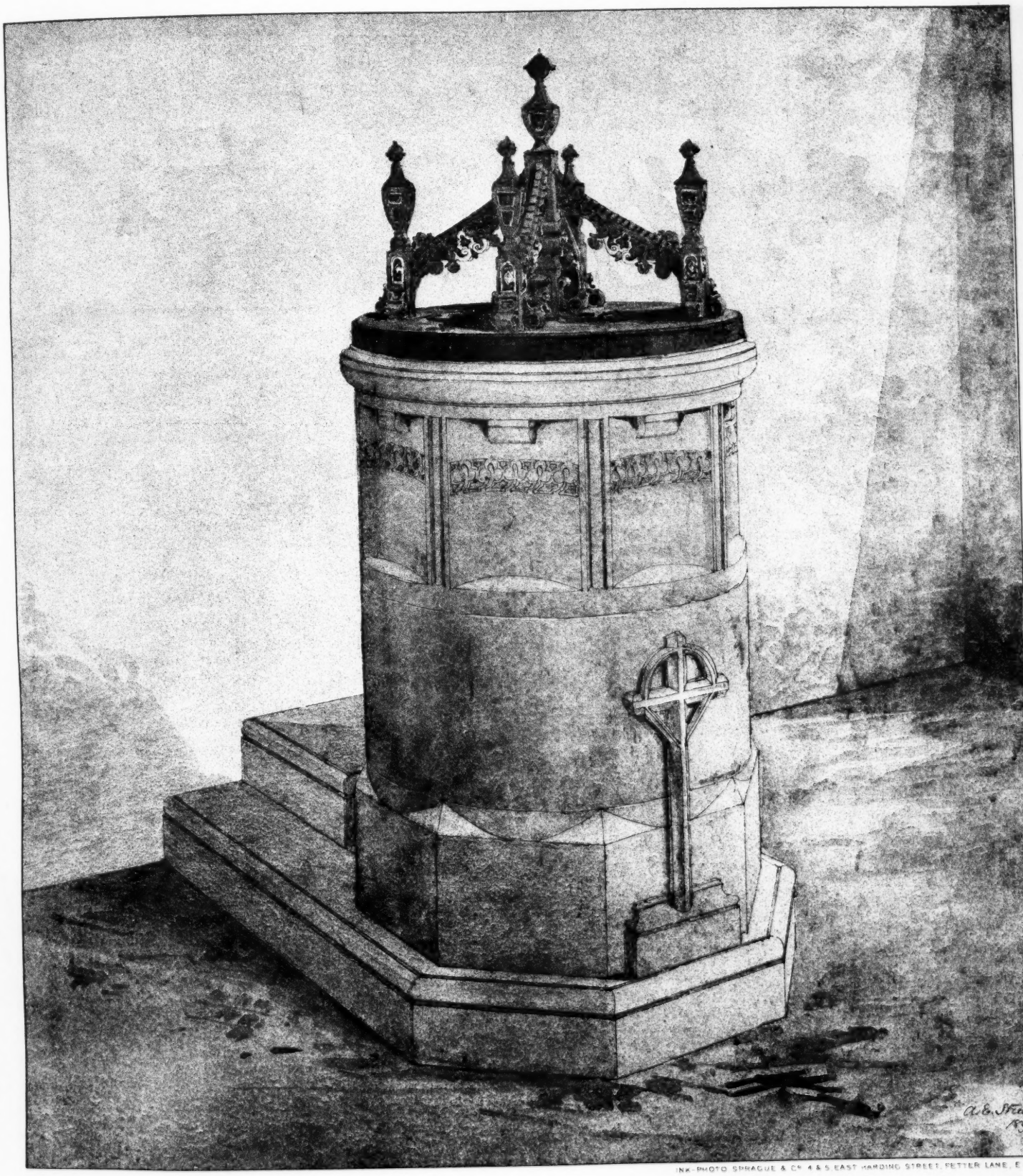

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